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Region

Wasatch-Cache
National Forest

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Final Environmental Impact Statement Summary Wasatch-Cache National Forest

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Introduction

This section summarizes the key content of the Final Environmental Impact Statement (FEIS) for Forest Plan Revision for the Wasatch-Cache National Forest. It can also be used with access to the Wasatch-Cache National Forest website (www.fs.fed.us/wcnf) where the entire documents are posted along with numerous maps showing where the forest management being described would occur.

Purpose and Need (FEIS Chapter 1)

The Proposed Action

The Forest Service proposes to revise the Land and Resource Management Plan (hereafter referred to as forest plan) for the Wasatch-Cache National Forest in order to meet legal and regulatory requirements, and to address changes, issues, and concerns that have arisen since the forest plan was originally released in 1985 (USDA Forest Service 1985).

Purpose

The purpose of the proposed action is to provide a revised Wasatch-Cache Forest Plan that will: 1) guide all natural resource management activities on the forest, 2) address changed conditions and direction that have occurred since the original plan was released, and 3) meet the objectives of federal laws, regulations, and policies. Specifically the revised forest plan will provide management direction for identified revision topics and forest-wide management direction in a framework of ecosystem management and sustainability.

In 1992, the Forest Supervisor determined that revision was needed because significant changes had occurred in conditions and demands. The conclusion was based on results published in the forest-wide monitoring report (USDA Forest Service 1992). This report found “serious weaknesses” which when taken in aggregate, resulted in a conclusion that a forest plan revision should be initiated.

Needs For Change

In the *Preliminary Analysis of the Management Situation Summary* (USDA Forest Service 1999) each resource area was examined along with the 1992 monitoring results and specific needs were identified where management should be changed or is required to be changed during revision. Ten areas were identified and are referred to as revision topics. In addition there is a need to change the basic framework and organization of the plan to reflect the integrated nature of ecosystem management. An ecosystem framework broadens the perspective from that of sustaining commodity outputs to that of sustaining ecological processes and a wide variety of goods, services, conditions, and values.

1. Watershed Health. Management direction for watershed health and condition is needed to maintain or restore the integrity of watersheds and soil quality. Healthy watersheds meet the needs of sustainable terrestrial and aquatic ecosystems and supply values for people such as clean drinking water, recreation and commodity uses. The riparian and water quality guidance in the 1985 plan sets limits on management. A more proactive approach that describes the desired watershed conditions to be achieved will provide a basis for needed management protection.

2. Biodiversity and Species Viability. There is a need to update vegetation management direction to provide for short- and long-term sustainability, including direction for restoration, management and maintenance of plant communities, as knowledge and understanding of human impacts grows. People have substantially affected ecological processes and biodiversity and will continue to do so. As the human population continues to grow, there will be ever increasing pressures on the remaining open space and on the quality and diversity of terrestrial and aquatic habitat. There is a need to integrate management direction for all resources to maintain viable populations within the context of overall multiple use objectives. This means that for any given land area, the set of objectives must reflect a compatible blending of uses and values with the capability of the land.

3. Road and Access Management. Management direction for an integrated transportation system that serves multiple functions is needed as a primary component of the desired future for a management area. A forest scale roads analysis is needed to comply with the National Forest System Road Management Rule (January 2001). The intent of the rule is to develop a science-based forest transportation system that meets the needs of the public, yet minimizes or reverses the environmental impacts often caused by roads.

4. Recreation and Scenery Management. Those areas where recreation will be emphasized need to be identified as the first step to provide guidance for managers dealing with increasing conflicts in uses as population and demands continue to grow. The population of the state of Utah is projected to grow by 65% by the year 2020 with most of the growth expected along the urban Wasatch Front. Because of this, settings of this forest will become even more valuable for the unique opportunities they provide. Current dispersed recreation use levels in some areas of the forest are so high that resource degradation is occurring. Direction is needed to provide for future desired recreation settings while sustaining ecosystem health. Updated mapping of recreation opportunity classes is needed to provide guidance on how to manage recreation across the forest. The outdated visual quality objectives contained in the current forest plan need to be replaced with guidance based on the more integrated Scenery Management System.

5. Special Designations. This revision topic includes protection of eligible Wild and Scenic stream and river segments, designation of additional Research Natural Areas and the designation of Special Interest Areas. The eligibility inventory required by the Wild and Scenic Rivers Act was completed in August 1999. Thirty-three segments were found eligible. Until suitability determinations are made, there is a need to protect the resource values and free-flowing character identified for each eligible segment during both ongoing activities and new proposals.

In 1998 an analysis of Research Natural Area (RNA) needs was completed for the national forests in Utah. These needs were defined as vegetation types that occur on National Forest

system lands that are currently lacking in existing RNAs in Utah. There is a need to identify areas of the Wasatch-Cache National Forest that have potential to contribute to the diversity within the RNA system on National Forest system lands in Utah.

Special Interest Areas can be designated to manage and protect an area's special characteristics or unique values. There is a need to identify areas on the Forest that merit this special attention and management.

6. Roadless Areas/Wilderness Management. This is one of the required items included in the planning regulations. The roadless area inventory was updated in 1999. There is a need to determine whether any of these areas should be recommended to Congress for designation as Wilderness. If lands are recommended, the revised plan will provide that these lands be protected and managed accordingly.

The Roadless Area Conservation Final Rule (RACR, January 12, 2001) established prohibitions on road construction, road reconstruction, and timber harvesting in inventoried roadless areas on National Forest System lands. Its intent is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management. Long-term management and protection of roadless areas as directed by Forest Service Manual Interim Directives 1920-2001-1, 2400-2001-3, and 7710-2001-2,3 needs to be addressed in the Forest Plan revision while court and administrative proceedings regarding the RACR are completed. There is a need to determine the appropriate balance of lands that allow development and those that do not.

7. Suitable Timberlands. This is one of the required items included in the planning regulations. It is also an important finding from the 1992 Monitoring Report. There is a need to identify those lands where the management direction will provide for timber production and where maintenance or restoration of properly functioning forest conditions may yield marketable timber products.

8. Rangeland Capability, Suitability and Forage Production. These are required items included in the planning regulations. There is a need to identify the acreage and estimated forage production outputs of areas suitable for grazing livestock as one of numerous uses that may be appropriate for a capable land area. There is also a need to modify current management direction for assigning value classes to riparian areas. Range management direction will be determined to ensure compatibility of this use with sustainable ecosystems and social values primarily incorporating direction from the 1996 Rangeland Health Environmental Impact Statement.

9. Oil and Gas Leasing. The forest plan was approved prior to the passage of the Federal Onshore Oil and Gas Reform Act of 1987. This Act changed the role of the Forest Service in the leasing process and required additional analysis to determine which lands are available for oil and gas leasing and under what conditions. Because of this, leasing direction in the 1985 forest plan is no longer valid. The forest plan was amended in 1994 to allow leasing on a portion of the north slope of the Uinta Mountains. A portion of the Uinta Mountains was specifically excluded from the 1994 decision through an appeal settlement decision (Levere and Heaton, 1994). There

is a need to make the leasing decision in the forest plan revision for this portion since there are suspended leases in the area that need to be acted upon and oil and gas industry continues to express interest in exploring the area.

10. Fire Management. There is a need to update fire management direction to address new national fire policy. In the past 15 years, we've grown to understand fire's role in shaping our ecosystems and the problems inherent in excluding fires from the landscape. The Forest Plan needs to address fire as an integral part of healthy ecosystems and to emphasize treatment efforts in ecosystems that are outside of properly functioning condition. It also needs to address how to manage fuels to reduce the risk of uncharacteristic, high-intensity wildland fire, especially in the urban-wildland interface.

Issues

The following issues were developed from public comments on the September 1999 Proposed Action- a first cut of the Forest Service's approach to forest plan revision.

Issue 1 – Recreation Use Conflicts/Access Management

How should increasing conflicts between and among users of motorized/mechanized vehicles (ATV's, snowmobiles, helicopters for skiing, and mountain bikes, ski area expansion into adjacent areas) and non-motorized recreation be addressed? How much and where is access appropriate for each of these groups? What user densities should we manage for in the future and where?

Issue 2 – Roadless Areas Management

How much and where should additional acreage be recommended for wilderness designation? How much, where, and how should inventoried roadless areas be protected from development? How much and where should inventoried roadless areas be available for which types of development and uses?

Issue 3 –Biodiversity and Species Viability

What are the key factors to emphasize and what is the proper balance of management and land use activities that can maintain biodiversity on the forest? Which areas need what kind of management direction to support overall biodiversity as well as viability of species?

Issue 4 – Concerns About Continued Economic Contributions and Personal/Social Benefits of the Forest

What will be the effects on traditional and current economic outputs and social benefits of the forest? These include forage for livestock, timber for harvest, production of oil and gas, recreation related services and all of the accompanying "quality of life/lifestyle" benefits obtained from the forest? Where and how much of these outputs and benefits can be expected in the future?

Issue 5 – Environmental, Social, and Economic Impacts of Uses

How will we ensure that impacts of uses to watershed conditions, terrestrial, riparian and aquatic wildlife and fish habitats, recreation settings and scenery, and local quality of life are kept within acceptable limits? Uses include livestock grazing, timber harvest, recreation, oil & gas development, and road and trail management.

Issue 6 – Appropriate Types and Amounts of Facility Development for Wildland Settings in the Forest

How much more recreation related facility development, where and of what types, should be allowed in the future?

Alternatives Considered (FEIS Chapter 2)

The FEIS explores the differences among 7 management alternatives for the Wasatch-Cache National Forest. These were developed to provide a range of options for management of the forest over the next 10 to 15 years. They are responsive to the needs for change ('Topics') and significant issues listed above. However, given that some of the issues are polarized, no one alternative fully resolves all of them. A set of maps with associated forest management direction accompanies each alternative.

Mapped Forest Management Direction

The National Forest Management Act requires us to develop management direction for each National Forest. This "direction" is to be expressed through goals, objectives, standards, guidelines, management prescriptions, desired future conditions, and monitoring and evaluation requirements for the forest. Some direction logically can be applied to an entire national forest, while other direction should apply only to specific areas of the forest. For this reason, maps are used with this FEIS to show where particular direction would apply by alternative. Management prescriptions, recreation opportunities (summer and winter), scenery management, and oil and gas leasing availability are mapped for each alternative analyzed in detail. These maps, along with the narrative descriptions later in this Chapter (under "Alternatives Considered in Detail"), are the basis for describing the key choices made in each alternative and displaying important differences between the alternatives.

Management Prescription Categories (MPC)

Eight major categories are listed in Table 1. These provide a sense of the management or treatment of the land that is intended to result in a particular condition being achieved or value(s) maintained. The MPC category numbers correspond to the numbers on **Management Prescription Maps** for each of the seven alternatives. However, prescription categories do not stand alone. They are one part of a management direction that also includes Desired Future Conditions, Goals, Objectives, Standards, Guidelines, and Monitoring and Evaluation Requirements. Where an activity is allowed by Prescription, standards and guidelines provide specific parameters within which the activity must be managed.

For Alternative 7 only, several new subcategories of prescriptions have been added to address comments. In Alternative 7 only, 3.1 is subdivided into Aquatic Habitat (3.1A) and Watershed Emphasis (3.1W) and 3.2 is subdivided into Terrestrial Habitat Emphasis Undeveloped (3.2U) and Developed (3.2D).

In addition, for Alternative 7 only, the prescription for recommended wilderness (1.5) allows two activities not allowed in other alternatives under this prescription. These are 1) prescribed fire to return fire dependent vegetation types to properly functioning conditions, and 2) existing snowmobiling until such time as Congress acts, to balance needs for closing other areas.

Recreation Opportunity Spectrum (ROS)

The Recreation Opportunity Spectrum (ROS) is a system of inventory and mapping of different types of recreation settings. These range along a scale from least developed (facilities, etc.) and most remote to most developed and least remote. Listed below is a brief explanation of the eight classes applied to each alternative in this analysis. Maps in the FEIS show where these recreation settings for summer are located and how they vary by alternative. FEIS Appendix D provides a more detailed description of these classes.

Wilderness/Primitive - Designated Wilderness; very high probability of solitude; closeness to nature; self-reliance, high challenge and risk; little evidence of people; Natural Evolving Landscape Character Theme
Wilderness/Semi-Primitive Non-Motorized - Designated Wilderness; high probability of solitude, closeness to nature, self-reliance high and moderately high challenge and risk; some evidence of others; Natural Evolving Landscape Character Theme
Recommended Wilderness/Semi-Primitive Non-Motorized - Recommended Wilderness; high probability of solitude, closeness to nature, self-reliance high and moderately high challenge and risk; some evidence of others; Natural Evolving Landscape Character Theme
Semi-Primitive Non-Motorized - High probability of solitude, closeness to nature, self-reliance, high to moderate challenge and risk; some evidence of others; Natural Appearing Landscape Character Theme.
Semi-Primitive Motorized - Moderate probability of solitude, closeness to nature, high degree of challenge and risk using motorized equipment; evidence of motorized equipment on trails and primitive roads, and by audible motor sounds; Natural Appearing Landscape Character Theme.
Roaded Natural - Moderate evidence of human sights and sounds; moderate concentration of users at campsites; little challenge or risk; Natural Appearing and Developed Natural Appearing Landscape Character Themes.
Rural - Opportunity to be with people is accepted and desirable as is facility convenience, little challenge or risk except for activities like downhill skiing; high interaction among users; Developed Natural Appearing and Resorts Natural Setting Landscape Character Theme.
Urban - Opportunity to be with others is very desirable as is facility convenience; challenge and risk are unimportant except for competitive sports, high interaction among people; Resort Natural Setting / Water Recreation Rural Appearing Landscape Character Theme.

Winter Recreation Classes

The Wasatch-Cache National Forest is using Winter Recreation Classes as a management tool to describe and map outdoor winter recreation areas. Winter Recreation (WR) is one of four mapped management direction elements used in FEIS. Four classes were defined for winter recreation. These are **Wilderness, Non-Motorized, Motorized, and Heliski**. These winter classes are also shown on maps and vary by alternative. (Appendix D of the FEIS includes detailed descriptions of the Winter Recreation classes.)

Scenery Management System (SMS)

The Scenery Management System (SMS) is an inventory and classification system for identifying landscape character themes and setting objectives for management of scenery. Listed below is a brief explanation of six "landscape character themes". These were assigned to the various areas of the forest by alternative. "Scenic integrity" is simply a qualitative measure of how well the landscape matches its character theme. High integrity means that given the character theme, for example "natural appearing", management actions, such as facility construction or vegetation treatment, should not result in obvious deviations from the expected appearance. Low integrity on the other hand would allow for some significant deviations from the expected appearance. Integrity objectives are assigned to areas of land on maps in the FEIS map packets. These vary by alternative primarily based on management prescriptions. FEIS Appendix D provides a more detailed description of the Scenery Management System.

Natural Evolving - The natural evolving landscape character originates primarily from natural disturbances and succession of plants, with subtle changes due to indirect human activities. The existing landscape character generally continues to change gradually over time through natural processes.

Natural Appearing - The existing landscape character has been influenced by both direct and indirect human activities, but appears natural to the majority of viewers. Natural elements such as native trees, shrubs, grasses, forbs, rock outcrops and streams or lakes dominate the views. While there is evidence of human influence from historic use, campgrounds, small organization camps, rustic structures and management activity, it would appear to be part of the landscape to the majority of viewers.

Developed Natural Appearing - This landscape character theme is characteristic of National, National Forest and State scenic byways with development, and developed and dispersed recreation facilities visible up to about 1/2 mile. In these areas, the roadway, recreation amenities, and development are anticipated features in the landscape. For users these amenities are part of the valued natural appearing landscape. Users of these amenities are attracted to the natural appearing landscape but desire a moderate to easy interaction with the landscape through the use of these amenities.

Resort Natural Setting - This landscape character theme is characteristic of developed recreation facilities such as ski resorts, and recreation resort communities. In these areas recreation amenities are the main attraction for people and why they come to an area. Facilities are designed and constructed to harmonize with the natural setting, rather than to contrast with that setting. While the facilities in the base areas are dominant, that dominance declines as it transitions onto the mountainsides up to the ridgelines. Likewise, recreational opportunities provided in base areas rely more heavily on constructed facilities, while those higher on the mountain become increasingly oriented toward the natural setting.

Water Recreation Rural Appearing - This theme is characteristic of the Pineview Reservoir recreation complex. The scenic qualities of Ogden Valley attract visitors, and maintaining rural character is important to many landowners in this areas. In these areas recreation amenities are the main attraction for people and why they come to an area. The cultural setting of farms, fields, and pastures influences development on the private lands. Housing, businesses, roads and other developments dominate some views.
Natural (Alternative 4 uses the outdated visual management system) - Under this system, the natural landscape character originates primarily from natural disturbances and succession of plants, with subtle changes due to indirect human activities. The existing landscape character generally continues to change gradually over time through natural processes. The degree of visual alteration is measured in terms of visual contrast with the surrounding natural landscape.

Description of Alternatives

Alternative 1 addresses concerns about a need for very strong emphasis on allowing nature to take its course, minimizing human interference with natural processes, maintenance of roadless landscapes, and restrictive approaches to sustainability forest-wide, given many unknowns. By "restrictive" we mean that human uses are only allowed when and where they are consistent with this emphasis. Current levels of development are maintained, but not increased. No timber harvest is allowed nor is any road construction or reconstruction in inventoried roadless areas. Specific activities needed to reduce impacts of existing development (for example realignment of eroding trails) are allowed. Expected commodity outputs compared with other alternatives are lower. Recreation opportunities are managed to allow a diversity of settings consistent with Forestwide Goals for watershed health, biodiversity and species viability, and ecological status, benchmarks, and reference areas. Winter motorized use is more restricted than currently. Snowmobiling is not allowed in inventoried roadless areas and where special habitat needs are present. Snowmobile routes on roads that have been cherry stemmed into roadless areas are open. Within inventoried roadless areas, summer motorized recreation is allowed on routes designated as open in current Travel Maps except for those within areas recommended as wilderness. User densities are managed (potential permit systems) in ROS classes primitive and semiprimitive. This alternative maintains all areas that currently meet criteria for semiprimitive and primitive recreation opportunities.

Alternative 2 addresses concerns about a need for strong emphasis on biodiversity, mimicking or restoring natural processes with active human management, conservation of large roadless areas, and moderate approaches to sustainability given many unknowns. Uses are allowed when and where they are compatible with achieving restoration emphasis or maintaining properly functioning conditions. In inventoried roadless areas, no road construction or reconstruction is allowed and timber harvest is strictly limited consistent with the National Roadless Area Conservation Rule. Expected commodity outputs may be irregular in their timing with possible spikes of high and low outputs. Recreation opportunities are managed to improve critical habitat, recover rare species, and where possible, provide for some increasing demands consistent with Forestwide Goals for watershed health, biodiversity and species viability, and ecological status, benchmarks, and reference areas. An overall diversity of recreation settings is maintained. Where inventoried roadless areas are recommended for wilderness or are next to existing wilderness, snowmobiling is not allowed. Snowmobile routes on roads that have been cherry stemmed into inventoried roadless areas are open. Within inventoried roadless areas,

summer motorized recreation is allowed on routes designated as open in current Travel Maps except for those within areas recommended as wilderness. This alternative maintains 90 percent of the currently mapped primitive and semi-primitive recreation opportunities.

Alternative 3 was originally developed as the "Proposed Action" for Forest Plan revision and was provided for public comment in September, 1999 and again as part of the five Preliminary Alternatives provided for public comment in September 2000. Public comment suggested that increased access for recreation did not necessarily belong only in Alternative 5 with increases in commodity uses even though those uses could inherently increase access through road building. In response we modified Alternative 3 from earlier versions to respond directly to providing increased recreation access in response to increasing demands, especially for winter motorized use. Alternative 3 provides a mix of uses and protection/restoration activities. It incorporates results of monitoring, project analyses and area assessments with some aspects of evolving policy such as the National Roadless Area Conservation Rule, although it does not apply this rule in its entirety. This alternative emphasizes adjusting management activities to ensure emphasis on ecosystem functioning and sustainability while providing some commodity outputs and a variety of recreation opportunities.

Alternative 4 is formally the "No Action" alternative required by the National Environmental Policy Act. It can also be described as the "continuation of management under direction of the 1985 forest plan" alternative. It represents the 1985 plan as written and amended, however, to contrast the direction of the 1985 plan with needs for change identified since 1992, other sources of management direction that have been applied, but not incorporated into the 1985 forest plan, are *not* included. The 1992 5 Year Monitoring Report found "serious weaknesses" which when taken in aggregate, resulted in a conclusion that a forest plan revision should be initiated. Alternative 4 assumes management direction to include:

a. All Forest Plan amendments (#1-35). Examples of amendments which affect large areas: Rangeland Health Amendment, Goshawk Amendment, Utah Fire Amendment
b. Current Travel Management Plans
c. Conservation strategies NOT requiring plan amendment applied project by project.
d. Conclusions from 1992 5-Year Monitoring Report (Section V. pgs. 106-115) that have been incorporated into subsequent plan implementation: Resource Inventories, Recreation Program Management, Riparian Management, Timber Objectives, Water Quality Monitoring, Biodiversity, Budget/Target Issues, and Monitoring Requirements.
e. 1985 Standards and Guidelines as amended.

Alternative 4 implements general direction from the 1985 plan emphasizing various outputs but with project-by-project application of ecosystem approach and findings from the 1992 5-Year Monitoring Report. Except where project analyses have resulted in other combinations of multiple use emphasis based on integration of resource management needs, forested vegetation is managed for growth and yield on suited timberlands and suited rangelands are managed primarily for livestock forage. Outputs are dependent on investments (for example- Forest Plan pages IV – 355-373, Range Improvements- fences, water developments, noxious weed control, plowing, seeding, spraying, sagebrush burning, stock trail construction) and thus are contingent on actual budget allocations.

This alternative emphasizes improved facilities for recreation and accommodation of increased demands for recreation through additional facility construction, again contingent on budgets. Expansion of developed and dispersed summer and winter recreation is envisioned. Project decisions have addressed expansion of winter developed recreation for some ski-based resort areas. Other decisions about ski-based resort development are based on Master Development Plans completed or in progress.

Alternative 5 addresses the concern that the Forest can and should be used to directly benefit economies, livelihoods, and utilitarian traditions of families and local communities through predictable sustained outputs while allowing a variety of other non-exclusive uses and minimizing restrictions or requirements that drive up operating costs. While this alternative was developed to respond to concerns that often might be associated with rural communities, constituents who reviewed the Preliminary Alternatives package pointed out that many rural communities adjacent to the Wasatch-Cache National Forest have a wide diversity of views and values regarding appropriate forest management. This alternative does respond to the desires of people (rural, urban, or otherwise) who would like to see continuation of many historic and/or traditional uses of the forest, sometimes even for new purposes, but with restrictions only as necessary to meet legal requirements. This alternative strives to accommodate a variety of uses within the same areas to avoid need for separation or restriction. Alternative 5 assumes active management for sustained yields can be used to improve productivity and health of the forest. Access plays a major role in the ability to use the land. Timber management to prevent insect, disease, and wildfire outbreaks is envisioned in this alternative. Livestock grazing tied to year-round local ranching operations is supported on forest by vegetation management to increase forage production. Grazing is also viewed as a tool to reduce fine fuels and competition with regeneration of young trees. This Alternative takes a restrained approach to sustaining species and their habitat. By restrained we mean striving to prevent listing but minimizing rather than assuming as necessary, restrictions on resource uses given the many unknowns about rare species. Forage for livestock, timber for harvest, oil and gas leasing, and recreation related services and opportunities are emphasized while actively managing all of these uses together to reduce or avoid conflicts and achieve improved productivity of the land and resources. Recreation opportunities in this alternative are increased over existing in the rural and roaded natural classes as a result of development of inventoried roadless areas for timber harvest and oil and gas exploration and development. Recreation is expected to be coordinated with other uses in the same areas in such a way that conflicts are minimized or avoided. More total recreation capacity is available because of increased numbers of facilities, allowance for higher user densities, and increased access.

Alternative 6 was identified as the DEIS Preferred Alternative. It addresses concerns about needs for emphasis on biodiversity, by mimicking natural processes in some areas with active human management while restoring natural processes to other areas with minimal human intrusion. Conservation of large roadless areas, highlighting of substantial areas for emphasis on sustaining important terrestrial and aquatic habitats, and concentrating activities in areas where they can be managed sustainably provides the basis for this alternative. Uses are allowed and mitigated to maintain ecosystem functions in some areas while in other areas uses are restricted to achieve restoration or protection of properly functioning ecosystem conditions. In inventoried roadless areas, no road construction or reconstruction is allowed and timber harvest is strictly

limited consistent with the National Roadless Area Conservation Rule. Expected commodity outputs are lower than recent years with some areas providing a limited but continual supply and others removed or reduced from commodity production to sustain other important wildland values (such as watershed functioning, ecological reserves and biodiversity corridors, opportunities for solitude, and special designation of reference benchmarks for learning-RNA/SIA). Recreation opportunities are managed intensively in some areas to meet increasing demands, especially in the wildland/urban interface. Areas further from major population bases are managed for a wider variety of recreation opportunities including substantial areas of primitive and semiprimitive classes. Winter recreation uses are separated in key areas to provide both motorized and non-motorized opportunities with access and parking. Total area available for snowmobiling is less than current but high and moderate use areas are maintained as open. Summer motorized recreation is allowed on routes designated as open in current Travel Maps.

Alternative 7 is the FEIS preferred alternative and was developed after public comments on the six alternatives described in the draft environmental impact statement had been reviewed, categorized, and analyzed. The purpose was to improve resolution of issues raised in public comments and to adapt the final preferred/decision alternative to current policy. Some components of the DEIS Preferred Alternative 6, were retained while other components were adjusted in response to comments and in response to recent policy regarding roads analysis and roadless area management.

Key changes made to the DEIS preferred alternative to develop this alternative include:

- Evaluation of individual roadless area values (FEIS Appendix C2) and identification of roadless areas or portions of roadless areas to be 1) recommended as wilderness, 2) maintained as roadless or undeveloped, or 3) where timber harvest, road construction or other development would be allowed.
- Clarification of intent with regard to allowed activities for management prescription categories 3.1 and 3.2 by 1) Dividing 3.1 into two subcategories- 3.1A specifically for riparian/aquatic emphasis and 3.1W specifically for upland watershed emphasis; and 2) Dividing 3.2 into two subcategories- 3.2U for terrestrial wildlife habitat not allowing development (primarily roading and timber harvest) and 3.2D for terrestrial wildlife habitat allowing this type of development (See also Tables of Allowed Activities for Alternative 7, and Revised Forest Plan Chapter 4A.5, Management Prescriptions).
- Clarification of intent in all prescriptions for allowing new trail construction (See Tables of Allowed Activities).
- Identification of fuel treatment needs in wildland urban interface areas and mapping of management prescriptions that allow mechanical fuel treatment on these areas (Prescription 2.6 does *not* allow this).
- Identification of additional areas of the North Slope Uinta Mountains where bighorn sheep habitat could be emphasized in the future should livestock grazing permits be voluntarily waived without preference.
- Adjustment of outputs and activities projections with improved information.
- Changes in prescription mapping, recreation opportunity class mapping, and winter recreation mapping for specific areas in response to public concerns.

Alternative 7 addresses concerns about needs for emphasis on biodiversity by attempting to balance human impacts and uses with maintenance of overall ecological integrity. This Alternative proposes actively managing (primarily vegetation treatments) some areas of the forest to restore ecological functioning and reduce hazardous fuels, allowing continued production of commodity resources for human use in many areas, and in other areas, allowing natural processes to proceed with less human intrusion. This management approach emphasizes conservation of most (75% of total) roadless areas and their values by maintaining them as undeveloped (with application of management prescriptions 1.5, 2.4, 2.6, 2.7, 3.1A, 3.1W, 3.2U, 4.1, 4.2- see Maps). It highlights substantial areas for emphasis on sustaining important terrestrial and aquatic habitats through active management with uses restricted, to achieve restoration or protection of properly functioning ecosystem conditions (prescriptions 3.1A, 3.2U and D- see Maps). This Alternative concentrates human uses and commodity production activities in areas where they can be managed sustainably, i.e. mitigated to maintain primary ecosystem functions (prescriptions 2.5, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1- see Maps). Expected total commodity outputs are slightly lower than in recent years with some areas providing a limited, but continual supply and others removed or reduced from commodity production to sustain other important wildland values (such as watershed functioning, ecological reserves and biodiversity corridors, opportunities for solitude, and special designation of reference benchmarks for learning such as RNA/SIA).

Recreation opportunities are managed intensively in selected areas to meet increasing demands, while recognizing the importance of watersheds especially in the vicinity of current and future urbanization. Areas further from major population bases are managed for a wider variety of recreation opportunities including substantial areas of primitive and semi-primitive classes. The popularity of recreation (especially camping) outside developed sites is recognized and specific actions to provide for this use while protecting watersheds and vegetation are proposed. Winter recreation uses are separated in several areas to provide both motorized and non-motorized opportunities with access and parking. Recognizing the distances that can be covered and growing demand, total area open for snowmobiling is 540,700 (44% of the Forest, 61% of the area not congressionally designated closed). New areas closed to snowmobiling for providing quality non-motorized winter opportunities total 7,500 acres or.8% of total forest acres and 190,700 acres of critical big game winter range (15% of total Forest). Summer motorized recreation is allowed on routes designated as open in current Travel Maps and several areas for potential future expansion of designated motorized routes are identified.

Comparison of Alternatives and Environmental Consequences
(FEIS Chapters 2 and 3)

The following estimates and comparisons of environmental consequences by alternative are based on key differences in potential effects. They assume that Standards and Guidelines contained in the revised Forest Plan apply to all alternatives except 4. Alternative 4 is the “No Action” which assumes continued application of the 1985 Plan as amended. In many cases standards and guidelines provide mitigation of activities, reducing or eliminating potential negative environmental effects.

A key difference between alternatives is how Management Prescription Categories (MPC) are mapped and the relative amount of each category. Table 1 provides a comparison of acres by prescription by alternative. However, acres alone do not provide the basis for conclusions about environmental effects because between alternatives, MPCs are not necessarily located in the same areas of the forest, allowed activities for the same MPC may vary between alternatives, and other management direction such as standards and guidelines applies forest-wide.

Table 1: Comparison of Alternatives Acres[1] by Management Prescription

	Alternatives						
	1	2	3	4	5	6	7
1.0 Wilderness							
1.1 Existing Wilderness - Opportunity Class I	178,000	178,000	178,000	61,900	178,000	143,200	143,200
1.2 Existing Wilderness – Opportunity Class II	105,800	105,800	105,800	98,300	105,800	139,400	139,400
1.3 Existing Wilderness – Opportunity Class III	25,100	25,100	25,100	19,600	25,100	26,200	26,200
1.4 Existing Wilderness - No Class	0	0	0	129,200	0	0	0
1.5 Recommended wilderness	388,900	145,900	51,500	0	0	69,400	73,500
2.0 Special Management Areas							
2.4 Research Natural Areas	5,600	5,600	4,600	6,200	5,300	5,600	5,600
2.5 Scenic Byways	20,600	20,600	20,600	22,000	23,100	22,800	21,100
2.6 Undeveloped Areas	*197,900*	192,000	85,000	0	2,000	88,500	111,200
2.7 Special Interest Areas and Special Areas	17,100	32,500	900	0	1,000	16,600	18,600
3.0 Protection, Maintenance or Restoration of Aquatic/Watershed or Terrestrial Integrity							
3.1 Aquatic Habitat/Watershed Emphasis	138,200	181,500	158,600	106,400	70,400	186,000	0
3.1a Aquatic Habitat	0	0	0	0	0	0	28,300
3.1w Watershed Emphasis	0	0	0	0	0	0	154,600
3.2 Terrestrial Habitat Emphasis	86,800	138,200	201,600	11,500	24,600	218,300	0
3.2d Terrestrial Habitat Emphasis – developed	0	0	0	0	0	0	89,200
3.2u Terrestrial Habitat Emphasis – undeveloped	0	0	0	0	0	0	122,300
4.0 Multiple Resource Uses With Recreation Needs and Opportunities							
4.1 Backcountry Non-motorized Recreation Settings	3,200	30,000	56,700	126,700	104,000	19,900	13,000
4.2 Dispersed Non-motorized Recreation Settings	4,500	3,600	3,200	3,900	20,500	20,000	3,500
4.3 Backcountry Motorized Recreation Settings	16,000	25,000	30,600	1,800	17,300	32,600	27,100
4.4 Dispersed Motorized Recreation Settings	30,900	38,300	41,700	16,600	78,200	49,100	53,800
4.5 Developed Recreation Areas	12,200	13,100	12,300	13,800	22,200	11,900	12,000

[1] Rounded to nearest 100 acres.

	Alternatives						
	1	2	3	4	5	6	7
5.0 Forested Vegetation Management Needs and Opportunities							
5.1 Maintain/Restore Forested Ecosystem Integrity	0	69,800	56,100	41,600	100	73,500	81,100
5.1/6.1 Mixed Forested/Rangeland Ecosystem Integrity	200	200	88,700	0	0	17,300	17,300
5.2 Manage Timber for Growth and Yield	0	0	43,800	251,000	182,100	34,800	34,500
5.2/6.2 Mixed Manage for Timber/Forage	0	0	0	0	186,000	0	0
6.0 Rangeland Vegetation Management Needs and Opportunities							
6.1 Maintain/Restore Rangeland Ecosystem Integrity	5,300	31,300	35,500	61,000	54,300	60,000	60,000
6.2 Manage for Livestock Forage Production	0	0	36,300	264,700	137,600	1,600	1,600
8.0 Concentrated Development Areas							
8.1 Mineral and Energy Development	3,000	3,000	3,000	3,000	3,000	3,000	3,000

Watershed Health

Recently, there has been substantial legal and administrative emphasis on the importance of protecting and sustaining stable watershed conditions as the foundation for all other resources and uses. Watersheds and water-bodies that do not meet desired conditions have been identified over the last few years through inventory work. Table 2 shows that all alternatives in the FEIS except Alternative 1 implement soil and water improvement projects at about the same pace to protect watershed values.

Table 2: Projected Projects to Improve Watershed Health
For 10 year planning period

	Alternatives						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Soil and Water Improvement Projects	0	20	20	20	20	20	20
Aquatic Resources Improvement Projects	0	50	15	20	10	25	25

Alternatives 3, 4, and 5 have the greatest potential to affect soil productivity through an irretrievable commitment of soil resources for timber harvest and vegetation treatment road, and oil and gas roads and facilities. Alternative 2 has the highest potential to cause short-term adverse affects to soil productivity because of the large amount of prescribed fire use in aspen and aspen/conifer mixed. Alternative 1 has the least short and long-term cumulative effects on soil productivity because of the small amount of project activities and outputs, and it has the greatest amount of land that is allocated to recommended wilderness and roadless protection where active management is very limited. When properly implemented, activities such as timber harvest and fire use have very little long-term commitment of soil resource. Only a fraction of those acres affected by timber harvest or fire use will actually suffer detrimental soil impacts such as displacement, compaction, or severe burning. Very few detrimental impacts to soils are expected from timber harvest (excluding roads, skid trails, and landings) and mechanical treatments for fuels reduction because these activities will leave adequate ground cover to protect soils and compaction is limited to a small amount of designated area.

New roads represent an irretrievable commitment of soil resources. On the WCNF, the long-term use of roads for new timber harvest and new roads and development for oil and gas activities will occur mainly in the Eastern Uintas Management Area. On lands adjacent to the WCNF in this management area, timber harvest and oil and gas development has occurred in the past and is continuing with activities that may affect soil and water resources such as road building and facility development. OHV and ATV use has been increasing on the WCNF and has had adverse effects to soils, particularly in specific areas where use is concentrated. In the long-term, education, enforcement, and on the ground management on and off the WCNF should help to reduce the adverse effects to soil productivity from these activities.

The short-term effects to water quality are similar to those described in the cumulative effects for soil productivity. This is because ground disturbing activities that have an adverse effect on soil productivity, usually have the potential for adverse effects on water quality, particularly in disturbance area that are close to water bodies. In the long term cumulatively, management activities on and off the WCNF should improve water quality through road decommissioning that will reduce erosion and sedimentation; vegetation treatments that will improve ground cover and reduce potential for wildfire; revised grazing guidelines that include bank trampling review during allotment management plan updates and annual operating permit review; and state and local environmental programs that assess water quality and plan actions for the improvement of impaired waters.

For the most part the detailed descriptions of effects from different activities indicate that effects to watershed under any alternative are manageable and relatively small given the relative areas of projected activities in the Forest, and the application of protective measures (standards, guidelines, and best management practices) during project implementation. Under all alternatives, no irreversible effects should occur from the proposed activities because no soil or water resources are affected where these resources cannot be returned to their previous condition.

Of the management activities that occur on the WCNF, only Timber Harvest/ Vegetation Treatment activities have the potential to substantially effect water yield. Utah and Wyoming are experiencing an increase in timber harvest on private lands in response to declining sales on public lands. This will cause an increase in water yield from private lands that are harvested. Between alternatives, water yield increase is assumed to be greatest with alternatives 4 and 5, which have the greatest amount of suited lands and would most likely have treatments proposed on them in addition to private land holdings. In all alternatives, most of the water yield increase would occur in the eastern Uintas, north part of the western Uintas, and Bear management areas and in private lands adjacent to these areas.

Vegetation

Of the vegetation cover types that currently have the highest deviations from historic ranges (aspen, Douglas-fir, oak, pinyon-juniper, sagebrush, tall forb and riparian), the key differences in effects on vegetation by alternative can be summarized based on the degree to which vegetation is treated. Table 3 shows acres of several types of treatment for the priority vegetation types. The amount of vegetation that would be moved toward properly functioning condition within the

10-year planning period would be greatest in Alternative 2. Alternatives 3, 6 and 7 are second greatest with about 60% as many acres as Alternative 2 treated. Alternatives 4 and 5 are third greatest with about 29% as many acres as Alternative 2 treated. Alternative 2 also treats the most sagebrush with prescribed fire to decrease sagebrush canopy and increase forbs and grasses. Alternatives 3, 6, and 7 treat about half as many acres of sagebrush and Alternatives 4 and 5 treat about one-quarter of the acres in Alternative 2 primarily because of the need to find alternative forage for livestock both prior to and after burning. The primary reason for treating oak is to reduce hazardous fuels in the wildland urban interface. All alternatives do this except 4 because the 1985 plan did not place emphasis on this. Alternatives 4 and 5 allow road construction and manage significantly more conifer vegetation for commercial growth and yield (prescription 5.2) than Alternatives 2, 3, 6, and 7. In Alternative 1, given that no prescribed fire or other vegetation treatment is allowed, the degree to which vegetation would move toward properly functioning condition is unpredictable. It would depend on natural processes such as insect, disease, wind and wildland fire.

Table 3. Comparison of treatments (prescribed fire, harvest, and mechanical fuels treatment) for each alternative over a 10-year period

Treatment	Vegetation Type	Alternatives							
		Total Acres	1	2	3	4	5	6	7
PRESCRIBED FIRE									
Prescribed Fire	Aspen & Aspen/Conifer	205,600	0	80,000	32,000	7,200	7,200	32,000	32,000
	Douglas-fir	87,500	0	4,000	2,000	0	0	2,000	2,000
	Sagebrush and Pinyon-Juniper	266,500	0	40,000	20,000	10,000	10,000	20,000	30,000
	Oak	90,800	0	40,000	20,000	8,000	20,000	20,000	8,000
Total Acres Treated by Prescribed Fire		650,400	0	164,000	74,000	25,200	37,200	74,000	72,000
HARVEST AND MECHANICAL TREATMENT									
Timber Harvest	Aspen and Conifer Harvest	556,600	0	6,500	7,500	12,500	15,500	5,000	8,500
Mech. Treatment	Oak (fuels treatment)	90,800	0	16,000	8,000	0	8,000	8,000	20,000
TOTAL ACRES TREATED									
Total Acres Treated (Harvest, Prescribed Fire, & Mechanical)			0	186,500	89,500	37,700	60,700	87,000	100,500
PERCENTATGE OF THE ACRES TREATED BY FIRE, HARVEST, AND MECHANICAL METHODS									
Of the Acres Treated, Percent Treated by Prescribed Fire			0%	88%	83%	67%	61%	85%	72%
Of the Acres Treated, Percent Treated by Timber Harvest			0%	3%	8%	33%	26%	6%	8%
Of the Acres Treated, Percent Mechanically Treated			0%	9%	9%	0%	13%	9%	20%

The differences between alternatives and their probability of reaching properly functioning condition are shown in Table 4. Alternative 2 shows the greatest likelihood for all cover types except Douglas-fir for reaching PFC within 10 decades. Alternative 5 shows the least accomplishment in reaching PFC because most vegetation treatment is by timber harvest which does not affect vast amounts of acres as fire. Proper functioning would mean less susceptibility to insect or disease epidemics, noxious weed invasion, or uncharacteristic wildfire and would prevent type conversions such as aspen being overtaken by conifer.

Table 4 Cover types in the Uinta Mountains and Overthrust Mountains Sections reaching Properly Functioning Condition within 10 Decades

Cover Types	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5	ALT 6	ALT 7
Sagebrush[1]	Yes	Yes	No	No	No	No	Yes
Oak	No	Yes	Yes	No	Yes[3]	Yes	Yes
Aspen	No	Yes	Yes	No	No	Yes	Yes
Douglas-Fir	No	No	No	No	No	No	No
Mixed Conifer Lodgepole	Yes [2]	Yes	Yes	No	No	Yes	Yes
Spruce Fir	No	Yes	No	No	No	No	No

[1]Modeled outside VDDT
[2]Uinta Mountain section only
[3]Overthrust Mountain section only

Botanical Resources

Botanical resources are very important, particularly the most rare elements of the flora, those that are classified as Threatened, Endangered, and Sensitive (TES) plant species. Table 5 provides a list of those species that have state or federal status as Threatened or Proposed. Additionally, we have identified those species that have been identified as imperiled and may warrant listing as Threatened or Endangered by the Utah Native Plant Society and the Utah Natural Heritage Program (Utah Rare Plant Meeting Results 2000). There are no plants currently listed as endangered on the Wasatch-Cache National Forest.

The alternatives have varying effects on botanical resources. For *Primula maguirei* (Maguire's Primrose) and *Viola frank-smithii* (Frank Smith Violet), threats for potential impacts due to recreation and associated activities are moderate to high under all alternatives and fire could negatively affect these populations. For *Sprianthes diluvialis* (Ute Ladies'-tresses Orchid), which has not been found in surveys in the Wasatch-Cache, the potential for moderate levels of impact to potential habitat are common to all alternatives. For *Dodecatheon dentatum var. utahense* (Utah Shooting Star), all alternatives would have moderate to high threats from recreation. For *Draba maguirei var. burkei* (Burke's Draba) Alternatives 1, 2, 3, 6, and 7 may pose the least potential impacts because of being within prescriptions that provide the least possibility of disturbance. Alternatives 4 and 5 have prescriptions in these areas that have higher possibilities of disturbance. However, in all alternatives, the largest population occurs in prescription 4.5, which has already experienced loss of plants due to development. *Botrychium lineare* is not currently on the U.S. Forest Service, Intermountain Region sensitive species list and is not currently given any formal consideration. The U.S. Fish and Wildlife Service has concluded that "…the overall magnitude of threats to *B. lineare* throughout its range is moderate

and the overall immediacy of these threats is nonimminent" (USDI USFWS 2002). The threats to the historic habitat on the Wasatch-Cache National Forest for this species have been minimized.

Table 5. Threatened, Candidate, and Species Likely to be Proposed as Threatened or Endangered on the Wasatch-Cache National Forest

Scientific Name	Common Name	Status	Distribution
Primula maguirei L. O. Williams	Maguire's Primrose	Threatened	Logan Canyon Endemic
Spiranthes diluvialis Sheviak	Ute ladies'-tresses	Threatened	Potential Habitat – through the Wasatch-Cache National Forest
Viola frank-smithii N. Holmgren	Frank Smith's Violet	Sensitive[2]	Logan Canyon Endemic
Dodecatheon dentatum Hook var. *utahense* N.H. Holmgren	Wasatch Shooting Star, Utah Shooting Star	Sensitive[1]	Salt Lake County Endemic
Draba maguirei C.L. Hitchc. var. *burkei* C.L. Hitchc.	Burke's Draba	Sensitive[1]	Northeastern Utah Endemic
Botrychium lineare W.H. Wagner	*Slender Moonwort*	*Candidate*	*Colorado, Oregon, Montana, Washington, (Historical sites in California, Idaho, Montana, Utah, Nevada and Quebec and New Brunswick, Canada)*

[1] Likely to be proposed, as Threatened or Endangered, because of rarity and/or because of potential threats

Terrestrial Wildlife

In evaluating effects on terrestrial wildlife species, it must be remembered that any potential activity may be detrimental to some species while it benefits others because of the wide variety of habitat needs. The primary determinant for evaluating management activities effects on species is the effects of those activities on vegetation communities relative to their historic range of variability.

Effects from timber harvest include fragmentation, displacement, and changes in vegetation structure and age class benefiting species that prefer more open areas in earlier successional stages. Species that prefer mature and old growth coniferous vegetation would see a reduction proportional to the amount of acres harvested however, given the abundance of currently mature and old age classes these species would continue to have available habitat under any alternative. Prescribed fire has similar effects favoring species that use younger vegetation age classes and applies to vegetation types other than conifer including aspen, sagebrush, and oak. Improving age class distribution of vegetation toward the historic range of variability will benefit the most species of terrestrial wildlife. Table 3 provides acres of projected harvest and prescribed fire for selected cover types by alternative.

Prescriptions 1.1-1.5 protect habitat, have minimum fragmentation, and generally favor species that prefer older vegetation age classes until set back by wildfire or wildland fire use. Table 1 shows relative acreages of these prescriptions by alternative.

Potential impacts from roads and trails include fragmentation of habitat and displacement of wildlife. The amount is a function of the amount of use on the road or trail. The greatest potential for adverse impacts associated with roads is from construction for timber harvest or oil and gas exploration and development with alternative 5, followed by 3, 4, 7, 6, 2, and 1 as shown in Table 16. In addition field development and well pads associated with oil and gas activities could further disrupt wildlife and fragment habitat. The amount of land disturbed ranges from 20 acres in Alternative 1 and 2 to 1o5 acres in Alternative 5.

The greatest potential effect from winter motorized access is disturbance of wintering big game and possibly increased competition for prey of Canada lynx. Acres open to snowmobiling within critical big game winter range are about 22,500 in Alternatives 1 and 2 (9% of total big game winter range), 54,000 in Alternative 7 (22%), 108,500 in Alternative 3 (44%), 115,700 in Alternative 5 (47%), and 141,700 in Alternative 4 (58%). Currently there are 96,100 acres within big game winter range (39%) open to snowmobiling. In Lynx Analysis Units (all of the Uinta Mountains) the Lynx Conservation Strategy recommends no net increase in the amount of groomed or designated over-the-snow routes or snowmobile play areas. The intent is to allow no more than existing compaction of snow in these areas because of potential for reducing the competitive advantage lynx has in uncompacted snow. Alternatives 1 and 2 would reduce the areas open to winter motorized use in the Uinta Mountains significantly while Alternatives 4 and 5 would open some currently closed areas to motorized use which is inconsistent with the Lynx Conservation Strategy. Alternative 3 maintains currently open areas and Alternatives 6 and 7 reduce the net of areas open to motorized use from existing but not to the large extent that Alternatives 1 and 2 do.

Aquatic and Semi-aquatic Resources

There are at least 24 fish species that inhabit the waters of the Wasatch Cache. Bonneville and Colorado cutthroat trout have been identified as sensitive. The June sucker, an endangered species, was stocked in Red Butte Reservoir in the early 1990 for holding and have since successfully reproduced. Of the seven amphibians historically present on the Forest, only the spotted from is on the sensitive species list.

Effects from timber harvest and oil and gas exploration and development would be primarily from road construction that requires stream crossings and the subsequent risk of sedimentation that causes direct and indirect mortality to aquatic and semi-aquatic species by covering and suffocating eggs. For timber harvest, Alternatives 4 and 5 would have the greatest potential impact followed by Alternative 3, 7, 6, 2 and 1 in that order. For oil and gas activities, Alternative 4 would have the least threats followed by alternatives 1 and 2, 6, 3, 7, and 5.

The prescription providing the greatest reduction in threats is 2.4, research natural areas. No timber harvest, vegetation treatments, road building, grazing or new recreation development is allowed. Prescriptions 1.1-1.5, wilderness and proposed wilderness, along with prescription 2.6,

undeveloped areas, also provide a high level of threat reduction in excluding timber harvest, vegetation treatments, road construction and new developed recreation al facilities. Management prescription 3.1 also provides a high level of threat reduction. To assess the affects of management prescriptions on aquatic species, the number of acres were summed for prescription categories 1.1-1.5, 2.4 and 3.1 and compared. Most of the acres gained in Alternative 1 are in proposed wilderness. Alternative 1 has the most acres in the combined prescriptions followed by Alternatives 2, 6, 7, 3, 4, and 5. Alternatives 2 and 7 also provide recognition for all populations of cutthroat trout.

Alternative 2 provides the best balance of protection and restoration opportunities for aquatic and semi-aquatic. Alternative 1 ranks out high as an alternative that provides for aquatic and semi-aquatic species but there are some difficulties in restoration efforts. Alternative 1 would make it very difficult to actively restore aspen stands adjacent to streams or to install migration barriers to preclude non-native fish because it depends entirely on natural processes. Alternatives 6, 7, and 3 allow for restoration work but they provide less emphasis on aquatic restoration and protection. Alternatives 4 and 5 provide the least emphasis on protection of native aquatic and semi-aquatic species. Alternative 7 encourages restoration of native cutthroat trout to six key drainages.

Timber Suitability and Production

Effects on the timber program are based on the amount of volume projected from both suited lands (prescription 5.2 or 6.2) and tentatively suited lands where harvest is allowed. A number of other factors affecting the program but not dependent on alternatives include quality of the timber, amount actually offered annually, accessibility, distance from the mill, and special requirements or contract provisions that have potential to increase cost of processing. Alternative 1 does not allow any timber harvest therefore there would be no timber program and mills dependent on National Forest timber would have to find other sources or go out of business. Alternative 2 designates no lands as suited for timber production but does allow harvest to meet other resource objectives, however road construction to access areas of inventoried roadless is not allowed and the type of offerings would be for lower value species such as aspen and fir. Alternatives 3, 4, 5, 6, and 7 designate differing amounts of area (Table 6) as suited for timber production and also allow timber harvest for meeting other resource objectives with volumes as shown in Table 7. Alternative 5 would provide the largest volume of quality material and would supply demand for one or two local mills. It would also require a significant shift in dollar allocation within the forest budget. Alternative 4 would provide the second largest volume and also would require reallocation of funds into the timber program. Alternatives 7, 6 and 3 would supply less than that needed to supply one mill on an annual basis but would continue to contribute toward meeting demand.

Table 6. Acres of Timber Suitability

	Alternative						
	1	**2**	**3**	**4**	**5**	**6**	***7***
Suited[1] Lands for Timber Production	0	0	38,000	193,900	226,000	28,900	28,900

[1] Areas available and capable with Mgt. Prescription 5.2 or 6.2.

Table 7. Timber Production Potential

	Alternatives						
	1	2	3	4	5	6	7
ASQ/TSPQ Volume (MMBF)	0 / 0	0 / 2.1	1.6 / 3.2	3.3 / 6.2	6.2 / 7.4	2.0 / 3.9	2.0/4.5

Rangeland Suitability and Livestock Grazing

Building upon the 1996 Wasatch-Cache National Forest Rangeland Health Forest Plan Amendment, Forest Plan revision management direction for all alternatives has been developed to maintain or improve rangeland conditions on National Forest administered lands. Direction occurs at both the Forest-wide and Management Area levels. Goals and objectives have been designed to achieve desired rangeland conditions over the long term, and to maintain or restore sustainable levels of forage production, livestock use, and ecosystem functions and processes. Furthermore, management direction for other resource programs—such as vegetation, soil, water, riparian, aquatic, wildlife, and recreation—provide additional guidance and resource protection in an integrated manner.

Currently, it is estimated that 95 percent of allotment rangelands with management objectives are either meeting or moving toward those objectives. In the 5% of areas where present rangeland conditions are not meeting objectives, conditions are expected to improve under all alternatives with the implementation of Forest Plan management direction. However, the rate of improvement may vary by alternative.

Several criteria that vary between alternatives were established to determine suitability. All alternatives remove 2,700 acres of developed recreation sites that are currently within open allotments. Alternatives 1, and 2 remove 10,400 acres because of closure of vacant allotments and Alternative 7 removes 2,500 acres for this reason. Alternatives 1,2,6, and 7 remove 7,800 acres from vacant allotments for bighorn sheep habitat, and Alternatives 1,2, and 6 remove 18,300 acres, and Alternative 3 removes 2,100 acres because they are in unsatisfactory condition. Alternative 2 removes an additional 26,000 acres of riparian areas for enhanced protection of Bonneville and Colorado River cutthroat trout habitat. Alternatives 4 and 5 remove no capable acres from the suitable category.

Table 8. Forest-Wide Suitable Rangeland Acres

	Alternative						
	1	2	3	4	5	6	7
Forest-Wide Suitable Rangelands[1]	263,500	237,500	297,900	300,000	300,000	273,900	289,800

[1] From FEIS Table RN-4.

Effects of removal of areas in unsatisfactory condition from suitable acres in Alternatives 1, 2, 3, and 6 would vary because of site-specific factors. Areas in unsatisfactory condition that can be easily avoided through livestock herding, and/or salting would be most likely to improve in ground cover and species composition over the long-term. Areas that are fenced or can be fenced would also be likely to improve if removed from livestock grazing. Areas in

unsatisfactory condition that are relatively small, scattered, or in locations where it is difficult to avoid grazing without expensive structural improvements (fence construction) would be much less likely to improve.

Alternative 7 (and the Revised Forest Plan) includes a forage utilization guideline for lower (30-40%) allowable use on areas in unsatisfactory condition rather than removing these areas from suitability. With implementation of this guideline, areas of both upland and riparian vegetation in unsatisfactory condition would improve with riparian areas restored more quickly than uplands. Improvement would be more consistent overall than in Alternatives 1, 2, 6, and 3 because a lower utilization standard could be applied to all the areas more easily than total avoidance of the areas. However, even this approach's success will depend on diligence in herding, salting, range improvement maintenance, and monitoring of utilization.

Alternatives 4 and 5 do not remove areas in unsatisfactory condition nor do they implement a lower forage utilization allowance for these areas. Some improvement of these areas is expected through implementation of management direction from the 1996 Rangeland Health Amendment, however it is expected that it would be more gradual and less consistent than in any of the other Alternatives.

Potential future changes in suitable acres are included in Alternatives 1, 2, and 6 by allowing for closure of Gilbert Peak, Henry's Fork-Hessie Lake, & Red Castle allotments should those permits be voluntarily waived without preference. Alternative 7 allows for these closures, as well as East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater allotments. The purpose of these closures would be reduced risk for disease transmission from domestic sheep to bighorn sheep as well as watershed protection and establishment of ungrazed benchmarks. Given that this would be based strictly on a voluntary action initiated by permit holders, net effects on permittee operations would be expected to be positive. (Otherwise the permittee could choose not to take this action). These wildlife and ungrazed resource condition values are foregone in Alternatives 3, 4, and 5.

Burning of sagebrush will increase forage production with Alternative 1 not allowing any prescribed fire and depending on wildland fire use, 2 and 7 providing the most benefit with 40,000 and 30,000 acres respectively, alternatives 3 and 6 with about 20,000 acres and Alternatives 4 and 5 with about 10,000 acres. Prescribed burning of sagebrush will require some pre and post treatment exclusion of grazing requiring that alternative forage be found for grazing that would normally be scheduled for the areas to be burned. Effects on grazing from recommended wilderness would be mitigated by allowing for continuation of existing motorized access included in term grazing permits.

Table 9. Estimated Authorized Livestock Grazing Outputs by Alternative

Livestock	10-Year Average AUMs [1]	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 [2]
Cattle	34,300	31,980	28,820	33,940	34,180	34,180	31,980	33,560
Sheep	24,600	23,160	20,870	24,580	24,750	24,750	23,160	24,300
Total	58,900	55,140	49,690	58,520	58,930	58,930	55,140	57,860

Decisions made in the Forest Planning process do *not* include issuance of Term Grazing Permits nor do they include decisions about stocking of allotments (i.e. permitted numbers). These decisions must be based on very specific site-dependent information and are made through either Allotment Management Planning or Term Permit Issuance or Modification. Therefore, the projections displayed in Table 9 are for outputs only. Permitted number changes are dependent on other decision-making processes.

Recreation Management

The primary means of expressing differences between alternatives for summer recreation is the amount land within the different classes of the Recreation Opportunity Spectrum (ROS). ROS is a management system and tool that is based on inventory and mapping of recreation settings. These settings occupy a spectrum from highly developed urban settings (e.g. ski area base facilities) to very primitive settings with no evidence of human development (much of the High Uintas Wilderness).

When the ROS categories were mapped for each of the alternatives it became apparent that the ROS map in the 1985 Forest Plan (Alternative 4/1985) does not reflect existing conditions because it reflects the anticipated ROS conditions that would have come about if the 1985 Forest Plan had been strictly implemented. However, budgets and priorities changed from 1985 to the present and the anticipated ROS conditions on the Forest did not occur. Therefore, the existing condition represents current ROS settings and should be used as the point of comparison for the other alternatives. Table 10 shows the amount of land in ROS classes by alternative. Maps showing ROS allocations by alternative are provided with the FEIS and available on the website (www.fs.fed.us/wcnf).

Table 10. Acres of Summer ROS Categories by Alternative and Existing Condition (EC).

ROS Category	Alternative							
	1	2	3	4/1985	5	6	7	EC
Wilderness/Primitive[1]	36,500	36,500	36,500	307,500	36,500	36,500	36,500	36,500
Wilderness/SPNM[2]	272,400	272,400	272,400	0	272,400	272,400	272,500	272,500
SPNM[3]	556,200	436,300	392,100	241,900	308,400	411,800	416,100	416,100
SPM[4]	135,800	188,700	223,600	85,600	268,800	201,400	276,800	276,800
RN (Roaded Natural)	234,600	301,500	311,100	545,600	349,300	313,400	227,900	233,600
Rural	720	720	720	13,600	720	720	6,400	720
Urban	144	144	144	0	144	144	144	144
NA[5]	0	0	0	45,200	0	0	0	0
TOTAL[6]	1,236,364	1,236,264	1,236,564	1,239,400	1,236,264	1,236,364	1,236,344	1,236,364

[1] Wilderness (MPC 1.1).
[2] Wilderness Semi Primitive Non-Motorized.
[3] Semi-Primitive Non Motorize and Recommended Wilderness (MPC1.5).
[4] Semi-Primitive Motorized.
[5] Lands acquired after 1985 plan.
[6] Totals differ due to GIS Mapping accuracy and rounding-off of decimal points.

Major differences between alternatives exist in the amount of recommended Wilderness, Semi-Primitive Non-motorized (SPNM), Semi-Primitive Motorized (SPM) and Roaded Natural (RN) ROS classes. *T*he ROS map in the 1985 Forest Plan (Alternative 4/1985) anticipated much more road development than what actually occurred and this is reflected in much more non-motorized ROS categories in the existing condition. Alternative 1 provides an emphasis on more primitive forms of summer recreation with the recommendation of substantial new acreage for Wilderness and protection of the values inherent to undeveloped areas. Alternative 5 gives increased emphasis to motorized and developed uses. Alternatives 2, 3, and 6 provide differing acreages of developed and undeveloped recreation opportunities between the amounts of Alternatives 1 and 5. Alternative 7 is almost the same as the existing condition with only about 6,000 acres added to rural from roaded natural. ROS maps show the particular recreation settings available in an area.

Maps that show the location for four classes of winter recreation are found in the FEIS. These are Heli-skiing, Motorized (snowmobile use), Non-motorized, and Wilderness (non-motorized) and Table 11 shows the acres for each of these by alternative. Effects on winter use are compared by the acres open and closed to snowmobiling and they vary by alternative**.** Reasons for changing closures from existing include protection of critical big game winter ranges, exclusion from recommended wilderness and/or roadless areas, and separation of motorized from non-motorized uses to enhance non-motorized recreation opportunities in specific locations.

Alternatives 1 and 2 are the most restrictive to motorized use reducing open areas by about 61% and 53% respectively from existing. Alternative 3 increases existing winter motorized access by about 4%. Alternative 4 (1985 Plan) had about 12% more area open to motorized that currently exists in Travel Management Plans. Alternative 5 would open additional areas to motorized use adding about 9% to existing. Alternatives 6 and 7 decrease existing motorized areas by about 14% and 15% respectively. However, a large portion of the reduction (about 30,000 acres) is acreage along the very steep Wasatch Front of the Ogden Ranger District, which is currently “open”, but not used by snowmobilers. Therefore the usable snowmobile terrain in the existing

condition is actually about 5% less than the acres shown and alternatives that close this area (1,2,6,7) have a 30,000 acre reduction that has no real effect on snowmobiling.

Heliskiing areas remain the same as current in Alternatives 5, 6 and 7. The area available for heliskiing is somewhat different and acreage is reduced in Alternative 3, and heliskiing is not allowed in Alternatives 1 and 2.

Alternative 5 allows ski area permit boundary expansion while the other 6 alternatives maintain existing permit boundaries.

Table 11. Acres of Winter Recreation: Heli-skiing, Motorized, Non-Motorized, Wilderness by Alternative and Existing Condition (EC)

Winter Recreation	Acres of Existing Condition and Alternatives							
	1	2	3	4/1985	5	6	7[1]	EC[2]
Heli-skiing	0	0	12,000	17,000	17,000	17,000	17,000	17,000
Motorized	246,800	296,700	663,600	723,300	693,900	548,700	540,700	634,800
Non-Motorized	679,200	629,800	263,000	163,400	232,600	377,900	385,900	291,600
Wilderness	308,900	308,900	308,900	307,500	308,900	308,900	308,900	308,900

[1] Alt 7 Allows motorized use in areas currently open within Recommended Wilderness (Prescription 1.5)
[2] Existing Condition

Scenery Management

Scenery is an integral component of all national forest landscapes, and contributes to the quality of people's experience.

For Scenery Management the major change between the 1985 forest plan and the revised forest plan is the replacement of the old Visual Management System with a new system for managing scenery – the Scenery Management System. The Scenery Management System (SMS) provides new terminology (terms are explained on page 11) and a different perspective within which to plan for scenic resources. Under the previous Visual Management System, human alteration of the natural landscape character was considered a negative impact to scenery. The forest was managed to acceptable degrees of deviation from the natural characteristic landscape using Visual Quality Objectives of preservation, retention, partial retention and modification. Under SMS, positive cultural modifications can be included in the landscape character to establish a baseline of measurement.

The Forest is classified in five landscape character themes that are tied to management prescriptions that may include positive cultural modifications within the theme definition. Alternative 4 uses the old system and is presented for contrast in Table 12.

Scenery has been altered in numerous locations across the Forest by both human and natural forces. Obvious significant effects on scenic resources arise from a variety of resource management activities and public uses such as recreation, timber management, wildland and prescribed fire, grazing, oil and gas leasing and development and utility corridors that alter

vegetation and the landscape appearances. The relative amount of these activities and uses vary by alternative. However, they are likely to be present to some extent in all alternatives.

Table 12. Percent of the WCNF of Landscape Character Theme and Scenic Integrity Objectives

LANDSCAPE CHARACTER	Scenic Integrity Objective	Alternative						
		1	2	3	4/1985	5	6	7
Natural evolving	Very High	56.3	36.7	29.1	N.A.	24.9	30.5	29.9
Natural appearing	High	33.8	43.6	36.6	N.A.	39.5	38.7	49.7
	Moderate	7.3	17.0	28.2	N.A.	2.2	25.2	14.7
	Low	0	0	3.5	N.A.	29.7	2.8	3.1
Developed natural appearing	High	1.9	2.0	1.9	N.A.	2.9	2.0	1.9
Resort natural setting	High	0.5	0.5	0.5	N.A.	0.5	0.5	0.5
Water recreation rural appearing	High	0.3	0.3	0.3	N.A.	0.3	0.3	0.3
Natural[1] VQO preservation	Very High	0	0	0	25.0	0	0	0
Natural[1] VQO retention	High	0	0	0	21.0	0	0	0
Natural[1] VQO partial retention	Moderate	0	0	0	27.0	0	0	0
Natural[1] VQO modification	Low	0	0	0	36.0	0	0	0
Grand Total		100	100	100	100	100	100	100

[1] Translation from Visual Management System terminology to Scenery Management System. Alternative 4 represents the 1985 Forest Plan direction for Scenic Resources.

Trails

Hiking, walking, bicycling, horseback riding, and motorized uses are all very popular activities on Wasatch-Cache trails. For this forest planning effort trail by trail allocation to different uses and the opening and closing of trails were not within the scope of the decisions to be made, and in general, most trail opportunities will continue as defined in current ranger district travel management plans. Currently, there are 306 miles of motorized trails on the Forest. Because of allocations of inventoried roadless areas to recommended wilderness in some alternatives, some trails that are currently open to motorized and mechanized uses would be closed to these uses. In Alternative 1, approximately 76 miles or 24 percent of existing trails would be closed to motorized use. In Alternative 2, approximately 7 miles or 2 percent of existing trail would be closed to motorized use. Alternatives 3 through 7 would have no change in motorized trail use from existing conditions.

Table 13. Miles of Existing Motorized Trials Closed to Motorized Use in Recommended Wilderness

	Alternative						
	1	2	3	4	5	6	7
Trails Closed to Motorized Use from Wilderness Recommendation	76	7	0	0	0	0	0

For mountain bikes (mechanized use) there are also effects of recommended wilderness by alternative. Because of allocations of inventoried roadless areas to recommended wilderness in some alternatives, some trails that are currently open to mountain biking would be closed to this use. In Alternative 1, approximately 167 miles of existing trail would be closed to mountain

biking use in 11 roadless areas. In Alternatives 2, 6, 7, and 3, approximately 53, 47, 43, and 12 miles of existing trail would be closed to mountain biking use. However, not all miles of trail that are open to mountain biking are actually suitable for average skill levels, therefore they may not be commonly used for that purpose. Alternatives 4 and 5 would have no change in mountain biking use from existing conditions.

Table 14. Miles of Existing Trails Closed to Mountain Biking in Recommended Wilderness

Roadless Area	Alternative						
	1	2	3	4	5	6	7
Burch Creek	6.5	NA	NA	NA	NA	NA	NA
High Uintas	12.6	7.8	7.8	NA	NA	5.9	5.9
Lakes	40.3	24.6	0	NA	NA	9.5	9.5
Lone Peak	0	0	NA	NA	NA	NA	NA
Mount Aire	11.3	NA	NA	NA	NA	NA	NA
Mount Naomi	33.5	15.5	3.8	NA	NA	3.8	NA
Mount Olympus	8.8	0	0	NA	NA	NA	NA
Nobletts	0.5	NA	NA	NA	NA	NA	NA
Stansbury	13.9	0	0	NA	NA	NA	NA
Twin Peaks	6.4	0	0	NA	NA	NA	NA
Upper South Fork	27.5	NA	0	NA	NA	27.5	27.5
Wellsville Mountains	0	0	0	NA	NA	0	NA
White Pine	5.3	5.3	NA	NA	NA	NA	NA
Widdop Mountain	0	NA	NA	NA	NA	NA	NA
Total	166.6	53.2	11.6	0	0	46.7	42.9

Inventoried Roadless Area Management

In addition to providing areas for future wilderness consideration, inventoried roadless areas possess social and ecological values and characteristics such as unique opportunities for non-motorized and motorized dispersed recreation in a primitive or semi-primitive setting, sources of clean drinking water, and large undisturbed landscapes that offer privacy and seclusion. These areas support a diversity of habitats for native plants and animal species, conserve biological diversity and provide opportunities for study and education.

Alternative 1 recommends the largest amount of acreage for wilderness designation, has the greatest amount of acreage managed as 2.6 (undeveloped areas), and applies the Roadless Area Conservation Rule to all inventoried roadless areas. Because of these factors it affords the most amount of protection to wilderness characteristics within inventoried roadless areas. Alternatives 2 and 6 protect large amounts of inventoried roadless acres primarily because of application of the Roadless Area Conservation Rule, but also because of the amount of inventoried roadless areas managed as undeveloped or recommended as wilderness. Alternatives 3 and 7 maintain most roadless values on a large part of the inventoried roadless area. Alternatives 4 and 5 maintain roadless values to a much lesser degree than the other alternatives and the potential to effect wilderness characteristics in roadless areas is highest under these alternatives. Refer to

Table 1, Management Prescription 1.5 to determine relative differences in areas recommended as wilderness.

Table 15. Inventoried Roadless Acres Disposition by Alternative

	Alternative						
Prescriptions that:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Maintain Roadless Area Values[1]	606,000	546,200	366,900	0	7,200	191,200	188,700
Mostly Maintain Roadless Area Values[2]	0	39,200	58,100	131,900	109,900	389,400	267,400
Allow Development	0	20,600	180,900	474,000	488,800	25,300	149,900

[1]No road construction, no timber harvest, no new trail or recreation development construction, no mechanical fuels treatments.
[2]No road construction, no timber harvest, trail construction, minimal new recreation development, and mechanical fuels treatments allowed.

Alternatives 1, 2 and 6 have the least potential timber management effects on inventoried roadless area values. In Alternatives 3, 4, and 5, undisturbed landscapes that are found in inventoried roadless areas could be altered by timber harvest and vegetation treatments to differing degrees. Timber harvest activities also increase the risk of impairing water quality and affecting habitat of some species.

Development of existing leases in inventoried roadless areas could affect roadless values under any alternative. Within the area being analyzed in the forest plan revision for future leasing, oil and gas activities resulting from new leases have the greatest potential to affect roadless area values in Alternative 5. In Alternatives 2, 3 and 6 areas are available for leasing however most do not allow surface occupancy. Alternative 7 does not surface occupancy on 20,900 acres while 27,000 acres allow surface occupancy with stipulations applied to protect resource values.

In Alternative 1 with motorized and mechanized recreation restricted in about 388,900 acres that are recommended as wilderness, user densities could increase in the remaining inventoried roadless areas. However, it is unlikely densities would increase to the degree that semi-primitive class is changed. Conversely, the primitive settings would be maintained in areas recommended as wilderness. Effects from recreation management in alternatives 2, 3, 6 and 7 would be similar to Alternative 1. In Alternatives 4 and 5 proposals could be considered that may affect primitive or semi-primitive settings since these alternatives allow new recreation facilities or road construction in inventoried roadless areas.

Road Management

The total overall miles of roads do not change substantially by alternatives. The one exception is in Alternative 1 that has 2.3 miles of open travel plan roads that would be closed to motorized uses as a result of inventoried roadless area being recommended for Wilderness. The management prescriptions assigned to areas may affect some road management objectives for specific areas. Maintenance effects are the same for all alternatives based on experienced budget levels.

Proposed miles of road construction vary by alternative and by prescription where construction is allowed. Alternative 5 proposes the most new road construction as a result of timber harvest and oil and gas leasing and has the most acreage where it is allowed by prescription. New road construction would be very minimal in Alternative 1, a result only of allowing access to existing leases. The risk of effects to soil and water resources resulting from road reconstruction is mitigated through standards and guidelines. In all alternatives road construction is precluded by prescription in areas managed for undeveloped or backcountry values. Alternatives 1, 2, and 6 further restrict road construction in inventoried roadless areas. The primitive and semi-primitive settings currently present would be maintained.

Table 16. Projected Road Construction and Projected Road Closure to Motorized Use (Total miles[1] for 10-year Planning Period)

	Alternative						
	1	2	3	4	5	6	7
New Timber Harvest Road Construction	0	6	39	49	49	6	7
Projected New Oil and Gas Exploration Roads	3	3	6	0	10-11	6	7.5
Projected New Oil and Gas Development Roads	0	0	4	0	4	4	4
Roads Closed to Motorized Use from wilderness Recommendation	2	0	0	0	0	0	0

[1] Rounded off to nearest mile.

Oil and Gas Leasing

The Appeal Settlement Zone referred to in the discussion below describes an area of about 68,300 acres defined through an appeal settlement decision in 1994. It is a band of land adjacent to the High Uintas Wilderness on the north slope of the Uinta Mountains. Alternative 1 does not allow new leasing in the Appeal Settlement Zone; however, development of existing leases within the Table Top Unit (an area of about 19,000 acres within the Hayden Fork, Stillwater and East Fork of the Bear River drainages) could affect resources on an estimated 20 acres because of oil and gas exploration activities. In Alternative 1 the majority of this area would be recommended as wilderness. Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could affect about 20 acres. Once existing leases expire, new leases could be issued but surface occupancy would not be allowed. The majority of this area would be managed for backcountry or undeveloped values. Alternative 3 precludes leasing availability in areas recommended for wilderness in the future and does not allow new leases with surface occupancy in areas managed for undeveloped and backcountry recreation values. New leases would be allowed outside those areas with stipulations applied to protect sensitive resources. Oil and gas activities are estimated to disturb about 75 acres. Some of the effects could be long-term because of field development. Some of this development is predicted within the Table Top Unit and within areas managed for backcountry and undeveloped values. Development within these areas could substantially affect the recreation setting. Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects are

probable. Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to disturb about 105 acres. In Alternative 6 new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be issued in areas managed for motorized dispersed recreation values and terrestrial habitat. In the Table Top area the degree of effects from Alternative 6 is similar to Alternative 3. In the remainder of the area the effects would be minimal because of no surface occupancy. In Alternative 7 leasing would be allowed with surface occupancy on about 27,000 acres with no surface occupancy allowed on 20, 900 acres. About 85 acres could be disturbed. Potential effects on resources from new leases are most likely to result from Alternative 5 and least likely in Alternative 1. Conversely, opportunities for oil and gas exploration and development are most restricted in Alternative 1 while Alternative 5 affords the greatest opportunities.

Decisions to make lands not administratively available for leasing or not to authorize lands for leasing precludes the exploration and potential discovery of oil and gas resources and can make subsurface oil and gas resources unrecoverable. If drilling and production occurs on adjacent private lands drainage of federal reserves may occur and result in lost federal revenues and returns to the counties and states. Also, the opportunity to explore and produce on adjacent leased lands may be affected by precluding exploration and production from reservoirs under unavailable lands.

Alternatives 1, 2, 3 6 and 7 would administratively eliminate various amounts of acreage from leasing consideration. Alternative 1 would remove the most acreage from leasing consideration followed by Alternatives 2, 7, 6 and 3. Alternative 5 allows all lands within the revision analysis area to be leased. Areas determined not administratively available are based on the lands recommended for wilderness.

Table 17. Available Acres and Not Available Acres by Alternative

	Alternative						
	1	2	3	4	5	6	7
Acres available for leasing	0	40,100	50,100	N/A	68,300	48,300	47,900
Acres not available for leasing	68,300	28,200	18,200	N/A	0	20,000	20,400

Footnote: N/A = not applicable

Table 18 displays the differences between the alternatives in the number of acres available for leasing and the number of acres where different stipulations would be applied. The size and shape of an area assigned an NSO stipulation affects a potential operator's ability to access the subsurface resource from adjacent lands. In Alternatives 2, 3, 6 and 7, areas assigned an NSO stipulation generally tend to be big blocks. The shape of an area where CSU would be applied is less important because CSU permits year-round occupancy and maintains potential for discovery and development of oil and gas resources.

Alternative 5 would have no acres stipulated with NSO.

Table 18. Acres with Stipulations Listed by Alternative

	Alternative						
	1	2	3	4	5	6	7
Acres Available for Leasing	0	40,100	50,100	--	68,300	48,300	47,900
Available with Stipulations							
No Surface Occupancy	0	40,100	37,200	--		44,700	20,900
Controlled Surface Use	0	0	2,100	--		3,600	24,900
Timing Limitation	0	0	300	--		0	100
CSU/TL	0	0	100	--		0	1,000
Standard Lease Terms	0	0	10,400	--	68,300	0	1,000

Special Designations

Special designations refer to Research Natural Areas (RNAs), Special Interest Areas (SIAs), Special Areas (SAs), and Wild and Scenic Rivers (WSRs). These designations are defined in detail in the FEIS within several management prescription categories: 2.4 for RNAs, and 2.7 for SIAs and SAs. Eligible Wild, Scenic, and Recreational Rivers are not mapped with prescriptions. In brief, an RNA is an example of important forest, shrubland, grassland, alpine, aquatic, and geologic types that have special or unique characteristics of scientific interest and importance. RNAs on the Wasatch-Cache will not be open to use by the general public. SIAs are areas with scenic, historical, geological, botanical, zoological, palentological, or other special characteristics. Special Areas are designed to protect and manage for public use and enjoyment, special recreation areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values. The primary distinction between SAs and SIAs, is that Special Areas have recreation as an underlying value while Special Interest Areas protect and “where appropriate” foster use.

WSRs include three categories of free-flowing rivers (Wild, Scenic, and Recreational) that differ based on the amount of development present in the river corridor. The FEIS makes no recommendation to Congress of which eligible rivers should be included in the National Wild and Scenic Rivers System. Thirty-three river segments were found to be eligible as a result of a 1999 inventory. Suitability determinations must be completed to address this. The current Forest Plan (in any alternative) protects the outstanding values for eligible rivers until such suitability studies and recommendations are completed.

Table 19. Acres of Research Natural Areas and Special Interest Areas (rounded to the nearest 100 acres) by alternative.

	Alternative						
Designation	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Red Butte RNA	4,650	4,650	4,650	5,500	4,650	4,650	4,650
Morris Creek RNA	1,050	1,050		200	200	1,050	1,050
Mollens Hollow RNA	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Total RNA Acres (MPC 2.4)[1]	6,900	6,900	5850	6,900	6,050	6,900	6,900
Red Butte SIA	850	850	850	0	850	850	850
Logan Canyon SIA	13800	13800	0	0	0	13800	22550
Willard Basin SIA	200	200	0	0	0	200	2200
Daniels Experimental Forest SIA	1700	0	0	0	0	1700	1700
Tri Canyons Special Area	0	17,600	0	0	0	0	0
Total SIA Acres (MPC 2.7)	16,550	32,450	850	0	850	16,550	27,300

[1] These acres include acres mapped as MPC 3.1 or MPC 3.1a within the boundary of the Research Natural Area.

The alternatives propose RNA changes in Morris Creek and Red Butte Canyon but not in Mollens Hollow and SIA additions as shown on Table 19. In Alternatives 1, 2, 6 and 7 additional acreage (an estimated 850 acres) contiguous to the existing **Morris Creek RNA** is added. With this addition, greater elevational gradient and associated climatic conditions, aspects, soils, plant communities, and dependent species would be represented in the RNA providing a larger and more diverse ecosystem to the RNA. Alternative 1, 2, 3, 5, 6, and 7 would remove approximately 850 acres from the **Red Butte Canyon RNA** and place those acres in Special Interest Area status because of the high amount of introduced and weedy species that occur. This provides a potential for manipulative restoration ecology research, which is incompatible with RNA direction. Alternative 4 keeps these acres in RNA status.

Lower Logan Canyon SIA would be added in Alternatives 1, 2, 6, and 7. In addition, Alternative 7 would manage the roadless (MPC 2.6) south-facing slopes in the lower portion of the canyon as an SIA (botanical area), which would add approximately 8,750 acres. For this area rock climbing activities or other undeveloped recreation might be limited or redirected, if it was determined that use patterns could affect specific plant species at sites where these species exist.

Lower Red Butte, a portion of the existing RNA (about 850 of the total 5140 acres) would be reclassified as an SIA in Alternative 1, 2, 3, 6 and 7. In these alternatives more flexibility for restoration ecology research would be provided (than if the area remained part of the RNA). Current uses in this prescription area would be modified so that the research could be conducted in a controlled manner.

Willard Basin SIA would be added in Alternatives 1, 2, 6, and 7. In this small tall forb area, recreation use patterns, mostly motorized uses, but also other non-motorized recreation that might affect the tall forb setting would be controlled to the extent that the relic tall forb community was protected.

W.C. Daniels School Forest has operated under an agreement between the Forest Service and Utah State University for many years. The State of Utah owns one of the four sections that make up the W.C. Daniels School Forest, while the other three are National Forest lands. It is unlike the previous three SIA's in that reclassification of it as an SIA (under Alternatives 1, 2, 6, and 7) is largely recognition of the existing situation, but places the area within the Forest Service Manual's direction for SIA's.

Alternative 2 includes a **potential Tri-Canyon Special Area**. Under this alternative a process would be initiated among the Forest Service, other interested governments and agencies, business groups, and citizenry to identify values, refine management direction and add additional detail to the desired future condition for this area based on this process. Under Alternative 1, large parts of this area are recommended for Wilderness. For Alternatives 3, 4, and 5 management would be as depicted by prescription. There would be no special recognition of the area other than values embodied in the mapped prescriptions.

Fire Management

Recent spotlighting of fire management policies and practices because of several severe fire seasons have lead to increased emphasis on suppression resources, fuel treatment, and fire restoration on the landscape. 2001 is the first year of substantially increased funding and personnel to accomplish these, however it is unclear whether this level of commitment will be stable for the life of the Forest Plan. Effects analysis assumes it will. There are a number of challenges in addition to funding including species at risk management, lack of experience and personnel for fire management project planning and implementation, potential for noxious weed invasion, sensitive watershed concerns, scenery resource concerns, smoke production, and dense populations in and surrounding the forest. These essentially apply to all alternatives.

Table 3 shows projected use of fire and mechanical treatment of fuels by vegetation cover type in acres by alternative. Alternatives 2, 3, and 6 plan more prescribed fire than alternatives 4 and 5 while alternative 1 does not allow prescribed fire. A key component of each alternative except 1 and 4 is the mechanical treatment of oakbrush to reduce hazardous fuels in the urban/wildland interface along the Wasatch front. Effects on fire management from livestock grazing may be significant because it affects the amount of fuel available to burn. In the case of fire suppression this can be an advantage while in the case of prescribed fire it can be a disadvantage because of lack of fine fuels needed to carry a lower-intensity fire. Grazing may need to be deferred before and after use of prescribed fire in order to allow proper regeneration of vegetation. Prescribed fire must also be coordinated with scenery management, species at risk and recreation. In each case these may be constraints on the design and implementation of restoring fire's role in Wasatch-Cache landscapes.

Timber harvest affects fire management by reducing fuel loadings and increasing openings to reduce fire's ability to transition from a surface fire to a crown fire. It can also create activity fuels which if not properly treated can lead to higher fuel loadings and increase the threat of ignition and hazard. Since Alternative 1 does not allow timber harvest or vegetation treatment (with the exception of wildland fire use) natural fuels would continue to accumulate and some

fires may increase in size and intensity. As timber stands age the threat of large stand replacing fires with more risk to firefighters, public, and adjoining areas becomes more likely. In Alternatives 2 and 6 that apply the Roadless Area Conservation Rule, fire use will be the favored treatment in inventoried roadless areas for ecosystem benefit and hazardous fuels reduction. Access to the forest effects fire management by increasing the potential of human-caused fire starts, but also increases the ability to report fires and suppress fires. The opposite is true in areas without access.

Economic and Social Effects

When this analysis considered the ten counties that surrounds and includes the Wasatch-Cache, it was found that few jobs and income are directly derived from the Forest. Traditional forest related jobs in timber, livestock grazing, oil and gas or other mineral production, and recreation uses make up a small part of this economy. When considering only the rural areas within the ten counties, all jobs traditionally related to the forest were still a very small portion of the total number of jobs in these rural areas. However, jobs in these sectors are important to those that depend on them, and their presence in the area helps keep the economy diverse which is a positive condition from an economic standpoint.

The different alternatives do project different outputs for timber products and minerals, and this affects projections for jobs and income across the seven alternatives. For livestock grazing the variance in jobs and income is less across the alternatives. The projections of the numbers of jobs by alternative affected in the rural setting of the ten county area are shown in Table 20 for current conditions and for the alternatives at the end of the decade after implementation. In each case the percentage change from current conditions is minor. The complete FEIS has much more detailed information on economic effects.

Table 20. Average Annual Employment (jobs) by Program by Alternative (Decade 1)

		Alternatives						
Resource	**Current**	**No Action**	**1**	**2**	**3**	**5**	**6**	**7**
	- - - - - - - - average annual employment, jobs- - - - - - - -							
Recreation/tourism	5,510	5,982	5,960	5,977	5,993	6,002	5,993	5,993
Wildlife and fish	80	88	88	88	88	88	88	88
Grazing	35	35	33	29	35	35	33	34
Wood products	60	60	0	18	25	63	33	37
Minerals	89	89	52	52	210	251	210	227
Forest Service expenditures	393	393	394	392	392	392	392	392
Total forest management	6,167	6,647	6,527	6,556	6,743	6,831	6,749	6,771
Percent change from current	---	8%	6%	6%	9%	11%	9%	10%

Table 21. Labor Income estimated by Program by Alternative (Decade 1)

Resource	Current	No Action	Alternatives 1	2	3	5	6	7
	- - - - - - - - average annual, in millions of dollars- - - - - - - -							
Recreation	108.2	117.6	117.0	117.4	117.8	117.9	117.8	117.8
Wildlife and Fish	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Grazing	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5
Wood products	1.4	1.4	0.0	0.4	0.6	1.4	0.8	0.8
Minerals	4.5	4.5	2.6	2.6	10.6	12.6	10.6	11.4
Forest Service expenditures	12.4	12.4	12.4	12.5	12.5	12.5	12.5	12.5
Total forest management	128.6	138.2	134.3	135.1	143.8	146.7	144.0	144.8
Percent change from current	---	7%	4%	5%	12%	14%	12%	13%

Source: MIG 2002.

All counties within the Wasatch-Cache National Forest analysis area except Cache, Rich, and Tooele counties in Utah have selected stable payments under the secure payments legislation. There will be no changes in payments to states by alternative to those counties selecting stable payments. Cache, Rich, and Tooele counties will continue receive a portion of Forest revenues, Table 22 highlights historical payments by program to these counties. Funds from timber harvesting and salvage are a significant portion of the related payments; it is likely any alternative with lower timber activity may return fewer funds to the counties. Grazing has been fairly stable over the last three fiscal years and this trend may continue. Finally, the fees from recreation have been declining and will likely continue to do so under all alternatives.

Table 22. Cache, Rich, and Tooele counties Utah, 25% payment, fiscal year 1999-2001.

Revenue category	Cache County FY99	FY00	FY01	Rich County FY99	FY00	FY01	Tooele County FY99	FY00	FY01
	nominal dollars								
Timber	51,448	33463	92,332	8,988	6,006	16,574	256	4,906	4,714
Grazing	25,006	25,660	24,750	4,368	4,606	4,443	4,687	4,792	4,392
Land use	4,308	3,128	5,017	752	561	900	22,314	4,118	1,858
Recreation Special Use	44,850	30,158	47,964	7,835	5,413	8,610	203,929	173,787	13,303
Power Line	7,529	7,204	7,344	1,315	1,293	1,318	773	789	801
Minerals	0	0	0	0	0	0	64	66	956
Recreation Fees	15,258	13,753	5,477	2,665	2,468	983	137	155	291
KV/Salvage	271,093	138,697	167,731	47,364	24,897	30,099	25,535	18,278	9,922
Total revenues	419,492	252,063	350,615	73,291	45,247	62,928	257,695	206,891	136,237
County 25% payment	104,873	63,016	87,654	18,323	11,312	15,735	64,424	51,723	34,059

Source USDA Forest Service 2001c.

As with economic effects, off-forest effects to social conditions in communities and counties surrounding the Forest (including American Indians) were determined to be minor.

Preferred Alternative

The Regional Forester has selected Alternative 7 as the Preferred (Decision) Alternative.

United States
Department of
Agriculture

Forest
Service

Intermountain
Region

Wasatch-Cache
National Forest

February 2003

Final Environmental Impact Statement Wasatch-Cache National Forest

FINAL ENVIRONMENTAL IMPACT STATEMENT

For the

WASATCH-CACHE NATIONAL FOREST
FOREST PLAN REVISION

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And
Uinta County, Wyoming

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ABSTRACT: This Final Environmental Impact Statement documents the analysis of seven alternatives which were developed for possible management of the 1,200,000 acres administered by Wasatch-Cache Cache National Forest. Alternative 1 addresses concerns about a need for strong emphasis on allowing nature to take its course, minimizing human interference with natural processes, and maintenance of roadless landscapes. Alternative 2 addresses concerns about a need for emphasis on biodiversity, mimicking or restoring natural processes with active human management, and conservation of large roadless areas. Alternative 3 provides a mix of uses and protection/restoration activities, incorporating results of monitoring, project analyses and area assessments with some aspects of the National Roadless Area Conservation Rule. Alternative 4 is formally the "No Action" alternative required, and can also be described as the "continuation of management under direction of the 1985 forest plan" alternative. Alternative 5 addresses the concern that the Forest can and should be used to directly benefit economies, livelihoods, and traditions of families and local communities through predictable sustained outputs while allowing a variety of other non-exclusive uses and minimizing restrictions or requirements that drive up operating costs. Alternative 6 addresses concerns about emphasis on biodiversity with conservation of large roadless areas, highlighting of substantial areas for important terrestrial and aquatic habitats, and concentrating activities in areas where they can be managed sustainably. Alternative 7, the preferred alternative, addresses concerns about needs for emphasis on biodiversity by attempting to balance human impacts and uses with maintenance of overall ecological integrity. This Alternative proposes actively managing (primarily vegetation treatments) some areas of the forest to restore ecological functioning and reduce hazardous fuels, allowing continued production of commodity resources for human use in many areas, and in other areas, allowing natural processes to proceed with less human intrusion. Recreation opportunities are managed intensively in selected areas to meet increasing demands, while recognizing the importance of watersheds especially in the vicinity of current and future urbanization. Areas further from major population bases are managed for a wider variety of recreation opportunities including substantial areas of primitive and semiprimitive classes.

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CHAPTER 1 - PURPOSE AND NEED

The Proposed Action

The Forest Service proposes to revise the Land and Resource Management Plan (hereafter referred to as forest plan) for the Wasatch-Cache National Forest in order to meet legal and regulatory requirements, and to address changes, issues, and concerns that have arisen since the forest plan was originally released in 1985 (USDA Forest Service 1985).

Regulations implementing the National Forest Management Act (NFMA) of 1976 (P.L. 94-588) require periodic revisions of forest plans. In 1982 instructions to revise forest plans were formulated in the Code of Federal Regulations at 36 CFR 219. Revised planning regulations were approved in November 2000 (Federal Register 2000); however, those forests that had initiated revision were allowed to complete the revision process under the 1982 regulations (36 CFR 219.35).

Purpose and Need for the Proposed Action

Purpose

The purpose of the proposed action is to provide a revised Wasatch-Cache Forest Plan that will: 1) guide all natural resource management activities on the forest, 2) address changed conditions and direction that have occurred since the original plan was released, and 3) meet the objectives of federal laws, regulations, and policies. Specifically the revised forest plan will provide management direction for identified revision topics and forest-wide management direction in a framework of ecosystem management and sustainability.

Need

The regulations implementing the NFMA outline conditions under which a revision of a forest plan is needed. Specific instructions found at 36 CFR 219.10(g) state:

> "A forest plan shall ordinarily be revised on a 10-year cycle or at least every 15 years. It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly, or when changes in Resource Planning Act policies, goals, or objectives would have a significant effect on forest level programs."

In 1992, the Forest Supervisor determined that revision was needed because significant changes had occurred in conditions and demands. The conclusion was based on results published in the forest-wide monitoring report (USDA Forest Service 1992). This report found "serious weaknesses" which when taken in aggregate, resulted in a conclusion that a forest plan revision should be initiated. The 1992 monitoring report concluded:

1. Resource inventories lacked quality information or were outdated.
2. There was a discrepancy between recreation goals and current conditions. Developed recreation site program needed to emphasize maintaining existing facilities prior to building new facilities.
3. Riparian area direction was limited and very general.
4. Timber volume objectives were inaccurate because of problems with timber volume conversions, timber availability assumptions, and technical concerns with implementation.
5. Water quality monitoring strategy needed strengthening.
6. An accurate assessment of relationships between resources was lacking. A new emphasis on integrated resource management was needed.
7. The forest plan was never fully funded and there was no indication of priority work to be accomplished with available budgets. The program of work needed to be prioritized to allow for funding shortfalls.
8. The monitoring plan was too general to ensure forest plan direction was being accomplished. An improved monitoring plan was needed.

These important findings were supplemented by recent reviews of the forest plan revealing that since the forest plan was approved in 1985, conditions and knowledge have changed substantially from those present at that time. In some cases, outside influences have changed and in others agency national policy has evolved. Some of the more significant changed conditions are:

- New approaches, philosophies and management policies have emerged to highlight the need to ensure the sustainability of ecosystems.

- Scientific knowledge and understanding of land use effects on watershed and wildlife habitats occurring in the forest has improved in recent years. There is also new and emerging knowledge and techniques in the areas of biodiversity and viability.

- The social and economic settings have changed. As nearby urban populations soar, recreational uses grow and peoples' demands for forest recreation increase. Public views about the values and uses of public land are changing. These changes necessitate new management approaches that anticipate trends while maintaining options for future generations.

Administrative setbacks delayed the revision from formally beginning in 1992. In 1999 the Forest Supervisor reviewed the relevant information and determined that revision of the 1985 Wasatch-Cache Forest Plan was still warranted and was even more necessary. Not only have conditions and expectations changed, the forest plan is currently 15 years old -- within the timeframe prescribed by the 1982 regulations for revision.

Need For Change

In the *Preliminary Analysis of the Management Situation Summary* (USDA Forest Service 1999a) each resource area was examined along with the 1992 monitoring results and specific needs were identified where management should be changed or is required to be changed during

revision. Ten areas were identified and are referred to as revision topics. In addition there is a need to change the basic framework and organization of the plan to reflect the integrated nature of ecosystem management. An ecosystem framework broadens the perspective from that of sustaining commodity outputs to that of sustaining ecological processes and a wide variety of goods, services, conditions, and values.

Revision Topics

Upon review of existing documentation, the Revision Team identified 10 "Need For Change Topics" for forest plan revision. It is important to remember that changes are being proposed to a plan that has already been developed and implemented. In revising the forest plan the focus is on those areas that must be reviewed in accordance with federal regulations, and on critical topics identified through new information, monitoring and public concern. Through the revision process the portions of the plan identified as needing change, and as important and appropriate at this time, are being addressed. It is important to focus on the most compelling needs for change in forest plan direction.

1. Watershed Health. Management direction for watershed health and condition is needed to maintain or restore the integrity of watersheds and soil quality. Healthy watersheds meet the needs of sustainable terrestrial and aquatic ecosystems and supply values for people such as clean drinking water, recreation and commodity uses. The riparian and water quality guidance in the 1985 plan sets limits on management. A more proactive approach that describes the desired watershed conditions to be achieved will provide a basis for needed management protection. Direction that establishes priority watersheds for restoration is needed to better integrate local with broader scale needs and funding priorities.

2. Biodiversity and Species Viability. There is a need to update vegetation management direction to provide for short- and long-term sustainability, including direction for restoration, management and maintenance of plant communities, as knowledge and understanding of human impacts grows. People have substantially affected ecological processes and biodiversity and will continue to do so. As the human population continues to grow, there will be ever increasing pressures on the remaining open space and on the quality and diversity of terrestrial and aquatic habitat. There is a need to integrate management direction for all resources to maintain viable populations within the context of overall multiple use objectives. This means that for any given land area, the set of objectives must reflect a compatible blending of uses and values with the capability of the land.

3. Road and Access Management. Management direction for an integrated transportation system that serves multiple functions is needed as a primary component of the desired future for a management area. Guidance needs to be established to comply with the National Forest System Road Management Rule. The intent of the rule is to develop a science-based forest transportation system that meets the needs of the public, yet minimizes or reverses the environmental impacts often caused by roads. The 1985 plan direction needs to be updated with adaptive standards that allow the latest science and technology to be used. The revised forest plan needs to establish the framework that allows future site-specific travel management decisions to be made that meet the integrated transportation system goals.

4. Recreation and Scenery Management. Those areas where recreation will be emphasized need to be identified as the first step to provide guidance for managers dealing with increasing conflicts in uses as population and demands continue to grow. The population of the state of Utah is projected to grow by 65 percent by the year 2020 with most of the growth expected along the urban Wasatch Front. Because of this, settings of this forest will become even more valuable for the unique opportunities they provide. Current dispersed recreation use levels in some areas of the forest are so high that resource degradation is occurring. Direction is needed to provide for future desired recreation settings while sustaining ecosystem health. Updated mapping of recreation opportunity classes is needed to provide guidance on how to manage recreation across the forest. The outdated visual quality objectives contained in the current forest plan need to be replaced with guidance based on the more integrated Scenery Management System. The niche of the Wasatch-Cache National Forest in the overall scheme of outdoor recreation settings in northern Utah needs to be clarified considering other federal, state, county and private providers. Niches and unique characteristics of the Wasatch-Cache National Forest include the following:

- Proximity to a large and growing urban area (nearly 1.5 million people). People can drive 5 to 40 minutes and be at a trailhead, ski area, or other developed recreation facility in the forest.
- A broad array of recreation settings and opportunities at various locations across the forest from fully developed to pristine wilderness.
- Outstanding terrain and snow conditions that offer world class skiing opportunities.
- Wildland mountain settings that are rarely duplicated on nearby public and private lands.
- Wide diversity of users, often with conflicting desires and demands for what they feel the forest should provide.

5. Special Designations. This revision topic includes protection of eligible Wild and Scenic stream and river segments, designation of additional Research Natural Areas and the designation of Special Interest Areas. The eligibility inventory required by the Wild and Scenic Rivers Act was completed in August 1999. Thirty-four segments were found eligible. Until suitability determinations are made, there is a need to protect the resource values and free-flowing character identified for each eligible segment during both ongoing activities and new proposals.

In 1998 an analysis of Research Natural Area (RNA) needs was completed for the national forests in Utah. These needs were defined as vegetation types that occur on National Forest system lands that are currently lacking in existing RNAs in Utah. There is a need to identify areas of the Wasatch-Cache National Forest that have potential to contribute to the diversity within the RNA system on National Forest system lands in Utah.

Special Interest Areas can be designated to manage and protect an area's special characteristic or unique values. There is a need to identify areas on the Forest that because merit this special attention and management.

6. Roadless Areas/Wilderness Management. This is one of the required items included in the planning regulations. The roadless area inventory was updated in 1999. There is a need to determine whether any of these areas should be recommended to Congress for designation as Wilderness. If lands are recommended, the revised plan will provide that these lands be

protected and managed accordingly. The forest plan revision provides an appropriate vehicle to examine opportunities to meet the intent of the Wilderness Act within specific areas of this national forest. For those roadless areas not recommended as Wilderness, there is a need to provide direction for desired conditions and the mix of uses and values to be emphasized. The purposeful recognition of roadless area values was identified as a 'need for change' in the evaluation of the 1985 forest plan. There is a need to determine the appropriate balance of lands that allow development and those that do not.

7. Suitable Timberlands. This is one of the required items included in the planning regulations. It is also an important finding from the 1992 Monitoring Report. There is a need to identify those lands where the management direction will provide for timber production and where maintenance or restoration of properly functioning forest conditions may yield marketable timber products. Management prescriptions (Appendix D) identify whether or not timber harvest is allowed. They also identify whether vegetation treatments are allowed including prescribed fire, thinning, or timber harvest incidental to meeting other resource objectives.

8. Rangeland Capability, Suitability and Forage Production. These are required items included in the planning regulations. There is a need to identify the acreage and estimated forage production for outputs from areas suitable for grazing livestock as one of numerous uses that may be appropriate for a capable land area. Revised Forest Plan range management direction to ensure compatibility of this use with sustainable ecosystems and social values is primarily derived by incorporating direction from the 1996 Rangeland Health Amendment. There is a need to modify that management direction in the area of assigning value classes to riparian areas to recognize species at risk. There is also a need for direction to restore rangelands in unsatisfactory condition. Other factors to be considered include disposition of vacant allotments, and the risk of livestock disease transmission to bighorn sheep.

9. Oil and Gas Leasing. The forest plan was approved prior to the passage of the Federal Onshore Oil and Gas Reform Act of 1987. This Act changed the role of the Forest Service in the leasing process and required additional analysis to determine which lands are available for oil and gas leasing and under what conditions. Because of this, leasing direction in the 1985 forest plan is no longer valid. The forest plan was amended in 1994 to allow leasing on a portion of the north slope of the Uinta Mountains. The portion of the Uinta Mountains specifically excluded from the 1994 decision through an appeal settlement decision (Levere and Heaton, 1994) was considered to be "roadless" at that time. When the roadless inventory was updated in 1999 it identified additional acres as roadless. However, because of specific language in the appeal settlement decision, these additional roadless acres are considered to be outside the scope of this leasing decision.

This area being addressed in the revision is the remaining portion of the forest identified as having a high potential for oil and gas reserves being present. There is a need to make the leasing decision in the forest plan revision since there are suspended leases in the area that need to be acted upon and oil and gas industry continues to express interest in exploring the area.

10. Fire Management. There is a need to update fire management direction to address new national fire policy. In the past 15 years, we've grown to understand fire's role in shaping our

ecosystems and the problems inherent in excluding fires from the landscape. The Forest Plan needs to address fire as an integral part of healthy ecosystems and to emphasize treatment efforts in ecosystems that are outside of properly functioning condition. It also needs to address how to manage fuels to reduce the risk of uncharacteristic, high-intensity wildland fire, especially in the wildland urban interface.

Decisions Made in a Forest Plan

A forest plan establishes key decisions for the long-term management of a national forest. These decisions are:

1. Establishment of forest-wide multiple-use goals and objectives, including a description of the desired future condition of the national forest as required by 36 CFR 219.11 (b).
2. Establishment of forest-wide management standards and guidelines to fulfill the requirements of 36 CFR 219.13 through 219.27.
3. Establishment of management areas and management prescriptions as required by 36 CFR 219.11 (c).
4. Establishment of lands suitable for the production of timber as required by 36 CFR 219.14.
5. Establishment of monitoring and evaluation requirements as required by 36 CFR 219.11 (d).
6. Recommendations to Congress of areas eligible for wilderness designation as required by 36 CFR 219.17 (a).

Decisions to be made in this planning process

Ultimately, the Forest Supervisor "shall determine the major public issues, management concerns, and resource use and development opportunities to be addressed in the planning process" (36 CFR 219.12 (b)). This Environmental Impact Statement analyzes a range of alternatives for revising management direction for the Wasatch-Cache National Forest. The Responsible Official for this analysis is the Regional Forester. Based on the analysis and subsequent public comments, the Responsible Official will select an alternative to revise the forest plan and document the rationale in a Record of Decision.

The Record of Decision will set a course of action for managing the forest for the next 10 to 15 years. However, project level environmental analysis will still need to be completed for specific proposals to implement the direction in the forest plan. A good example of this involves the designation of dispersed recreation sites. The forest plan may contain general direction to designate sites in order to protect land and water resources, but a site-specific analysis and decision will have to be made about the number of sites and their exact locations. This process is called staged decision-making because a series of decisions will be necessary to carry out projects as specific needs, priorities, locations, conditions, monitoring results, and public response change or become more apparent.

Significant Issues

Issue Identification

The Revision Team identified the following set of issues after a review of the many letters that responded to the September 1999 Proposed Action for the Plan revision as well as compilation of work completed at numerous public workshops in November and December of 1999. Over 800 comments from approximately 250 letters touched on every aspect of forest management. Narrowing the scope of the issues to those significant to this analysis is a primary task of the team and forest leadership.

Following are the issues that were determined to have the potential to drive development of alternatives. Most issues have several components and a brief discussion explains the basis for concern.

Issue 1 – Recreation Use Conflicts/Access Management

How should increasing conflicts between and among users of motorized/mechanized vehicles (ATVs, snowmobiles, helicopters for skiing, *ski area expansion into adjacent areas*, and mountain bikes) and non-motorized recreation be addressed? How much and where is access appropriate for each of these groups? What user densities should we manage for in the future and where?

Since the 1985 plan, the population has increased, types of recreation have diversified, and technology for off road vehicles, snowmobiles, mountain bikes and other conveyances has improved. This allows users access to portions of the forest they could not reach in the past. As use on the forest increases, conflicts between users occur more frequently. User densities and the perceived degree of freedom or restrictions affect desired recreation opportunities. Also, as demographics of the population change over time, the additional considerations for both older and younger segments as well as the physically challenged are increasing in importance.

Type. In general, most conflicts occur between motorized/mechanized and non-motorized users of the forest. The actual areas of conflict vary with the season of use (winter/summer). From the motorized user's perspective, their use is less affected by the presence of the non-motorized user. However, non-motorized users feel that the quality of their experience is compromised by motorized use (e.g. sound, smell, speeding, safety, and dust). Some feel that separating uses is the best way to address conflicts between users, while others feel that this would only drive the polarized user groups further apart, diminishing the opportunity to resolve conflicts. Conflicts tend to be most prevalent in easily accessed terrain and areas closest to population centers.

The evolution of ATVs, mountain bikes, and snowmobiles and their skyrocketing popularity in the past decade have created new user conflicts never anticipated in the 1985 plan.

Extent. Many people are concerned about being prohibited from areas previously open to them. Some feel we should be creating new motorized opportunities while others feel that we have too

much to manage already. Some users, such as those with mountain bikes, are expanding their ranges, accessing areas previously not used.

Ability Levels. Some feel that a continuum of challenging experiences needs to be available. With the advent of new technology, many off-road vehicles (especially snowmobiles) and four wheel drives are now able to venture into areas once considered inaccessible. This combined with more people results in an ever-increasing demand for additional motorized areas.

User Densities. Many people have stated that they want to see the forest continue to be managed for the same opportunities available today. Although they have seen a marked increase in the number of people recreating, user densities are still within the realm of desirable recreation experiences. However, there appears to be a belief for some that no action is necessary to sustain current opportunities in the face of rapidly increasing use and demand. Others state they would be willing to submit to various limits such as permit systems or alternating use times in order to achieve opportunities similar to those available now. They point out that currently we have no systematic way of monitoring use and use trends and that inaction results in use patterns that are difficult or impossible to control or change once they have been established.

Issue 2 – Roadless Area Management

How much and where should additional acreage be recommended for wilderness designation? How much, where, and how should inventoried roadless areas be protected from development? How much and where should inventoried roadless areas be available for which types of development and uses?

About 300,000 acres of the Wasatch-Cache National Forest is designated as wilderness. About 572,000 of the remaining acres are inventoried as roadless. Federal regulations direct national forests to evaluate roadless areas for wilderness recommendation during the forest planning process. Beyond this, in recent times numerous values associated with roadless areas have been highlighted. It is now recognized that roadless areas have significant ecological as well as social values. The values of roadless areas are of both local and national significance. Roadless areas are often aquatic strongholds for fish. They also often provide critical habitat and migration routes for many wildlife species and they are particularly important for species requiring large home ranges.

Some people want to see all inventoried roadless areas managed to protect their undeveloped character. Some of these see Wilderness designation as the only permanent protection avenue available. They are concerned about whether any other management prescriptions actually protect roadless character. For some, even those prescriptions that do not allow land-altering activities but do allow winter motorized use have a negative impact on roadless values. Others feel these lands need not be protected and should be available for development for a variety of uses. As population and demand continue to grow, some people feel that roadless areas offer the opportunity to spread use out to meet growing demands and reduce impacts. Others are not advocating new road construction but are very concerned about maintaining motorized access currently available. They see designation of wilderness followed by protection of roadless areas

as incremental steps toward additional restrictions on their activities and uses of the forest. Another point of view is that certain key roadless areas should be identified and protected.

Issue 3 –Biodiversity and Species Viability

What are the key factors to emphasize and what is the proper balance of management and land use activities that can maintain biodiversity on the forest? Which areas need what kind of management direction to support overall biodiversity as well as viability of species?

In 1992, the Chief of the Forest Service committed the agency to the practice of ecosystem management with its goals to produce diverse, healthy, productive and sustainable ecosystems while operating under a philosophy based on environmental sensitivity, social responsibility, economic feasibility and scientific principles. Watersheds are an essential component of these ecosystems. It should be assumed when we refer to sustainability and biodiversity that watershed health is an inherent consideration. Biological diversity (biodiversity) refers to the diversity of life. There are at least three levels of biological diversity: genetic, species, and ecosystem diversity. Maintaining biodiversity at appropriate scales is a key part of ecosystem management.

Major land use decisions can and have changed the biodiversity of the forest. Conserving biodiversity while managing the land for multiple uses is a balancing act. While the science of biodiversity is not new, interpretations and applications to the management of national forests is relatively new. Goals for each action must be carefully assessed, and trade-offs between resource needs and human wants must be made.

While various goals, objectives, general direction, and standards and guidelines in the 1985 forest plan considered some elements of biodiversity, this revision attempts to take a more holistic approach to viewing the forest.

People have a broad range of opinions about what management is needed to meet goals for biodiversity and viability. Some feel we should manage conservatively, taking a more passive approach to management allowing natural processes to dominate, while others feel a more active approach is necessary to restore biodiversity. Some feel that we should place our primary emphasis on factors such as: protecting regionally significant corridors; protecting and/or restoring connectivity of unfragmented forested lands; reintroductions of historically native predators (e.g. grizzly bears and wolves); discontinuing predator control and introductions of non-native species; eradication of non-native species; expand protection of species to include invertebrates, reptiles, and amphibians as well as neotropical migrants, and more well known wildlife already identified as threatened, endangered, or sensitive; protection of old growth and special habitats; reintroduction of natural fires; allowing the natural role of insects and disease; removing livestock grazing; identifying and protecting a system of reserves representing all native ecosystem types and seral stages across their historic range of variation; and protecting all existing roadless areas from any extractive or motorized uses to maintain values such as Canada lynx habitat. Others, however, feel that these measures are extreme, unnecessary, and will only result in a loss in the ability of the public to use and enjoy their national forest. Some are especially concerned about what affect these actions would have on traditional uses of the forest

such as livestock grazing and timber harvest. They feel we simply do not know enough to justify these actions.

Issue 4 – Concerns About Continued Economic Contributions and Personal/Social Benefits of the Forest

What will be the effects on traditional and current economic outputs and social benefits of the forest? These include forage for livestock, timber for harvest, production of oil and gas, recreation related services and all of the accompanying "quality of life/lifestyle" benefits obtained from the forest? Where and how much of these outputs and benefits can be expected in the future?

Communities near the Wasatch-Cache National Forest have often benefited from products or uses of public land. Traditional uses here have centered on wood products, livestock forage, ski areas, and mineral and oil and gas production. As recreation uses and popularity have increased, some communities have seen economic benefits from increased visitation through providing services (food and gas), equipment, and some outfitted guiding services. As restrictions and investments related to protection of sensitive and other species increase, there is concern that economic viability of many traditional uses becomes marginal or not viable. Changes in forest management can affect traditions, lifestyles, and the economic livelihood of residents and some communities. Those who depend on the forests for their livelihoods are concerned that other uses (e.g. recreation, wildlife, rare species, etc.) will take precedence. Others suggest that a variety of other values such as clean air and water, wildland scenery, and maintenance of biodiversity be included in the analysis of the "net public benefit."

Livestock Grazing. The economic well being of a portion of the local livestock industry is dependent upon a continual source of available forage on federally administered rangelands. The western rural lifestyle and traditions associated with the livestock industry are highly valued by permit holders and rural communities. Many permittees (and in some cases their forefathers) have made a financial and emotional investment throughout their lifetime to continue the tradition. Many have seen range conditions improve over time. In addition, the continuation of agriculture in these areas in light of the burgeoning growth in northern Utah prevents development and loss of open space. Increasing management requirements for grazing in light of threatened, endangered and sensitive species and other conflicts (such as recreation) are of great concern to permit holders and rural communities. Permit holders are concerned that management prescriptions that do not emphasize grazing will result in reductions in grazing and subsequent economic benefits. Other people view the economic contribution from grazing as limited, the environmental and administrative costs as too high, and feel grazing should be reduced, phased out, or eliminated.

Timber Harvest. Forested lands serve both as important habitats for plants and animals and as a source of wood products. Traditionally, all the timber volume sold on the forest was processed at mills in local communities. Operators and employees of these mills are concerned about availability of timber from public lands to sustain their businesses. Some people want to see most of the forested acres available for timber harvest and wood production. Others have expressed concern about the methods of harvest (i.e. do they lead to successful reforestation) and

post harvest appearance. (i.e. does it degrade the visual integrity of the area). Some people feel harvest should be restricted or eliminated because they view the economic contribution from timber harvest as limited, and the administrative and environmental costs too high. They feel the net public benefit measured in forest planning should include less tangible benefits such as those associated with ecological systems (e.g. clean air and water, nutrient cycling, habitat for sustenance of biodiversity, wildland settings for recreation).

Oil and Gas Leasing. While much of the economic focus of Summit County, Utah is centered on the Park City area and its economy, the exploration and extraction of oil and gas reserves over the eastern part of the county have contributed significantly to the economic base of the area. Summit County also receives revenue from taxes, royalties, and other fees assessed to operations. These revenues are used to enhance the communities through construction of public facilities such as public schools, libraries, community centers, etc. Residents of Uinta County, Wyoming and Summit County, Utah rely on the production of oil and gas reserves to provide for continued services and infrastructure. Others feel that the economic benefits do not outweigh the environmental costs and feel forest lands should be protected from oil and gas exploration and development.

Recreation Related Contributions. There are a variety of services associated with recreation in the forest including nearby convenience stores, gasoline, food, recreational and off-road vehicle rental, sales and maintenance, concessionaires, outfitter guides, and outdoor sporting goods sales to name only a few. Economic contributions to local communities from these sources are on the rise. Depending on forest recreation opportunities provided, a range of potential benefits to communities can be realized. The amount of motorized and non-motorized opportunities available, the number of visitors, and degree of management restrictions all affect the social and economic contributions of recreation to communities. In addition to economic benefits, various recreation opportunities in the forest enhance the quality of life for residents in nearby communities.

Ski Area Contributions. Skiing on national forest lands is important to the economy of Salt Lake and Summit Counties, and to a lesser degree Weber County. Many feel the premier skiing offered in northern Utah contributes to their reason for living near and/or visiting the Wasatch Front. World-class ski areas and high quality snow bring people from around the world to ski here. Of the nearly three million skier visits to Utah in 1996, nearly half were to the five large resorts on the forest. Resort owners and patrons see improvements and expansion as essential to providing a desirable, safe skiing experience and attracting new and return customers. At the same time, increased restrictions because of threatened, endangered, and sensitive species and conflicts with opponents of development threaten profitability and management flexibility. Others are concerned that environmental and social tradeoffs for this development are too great and are opposed to any further development, improvements or expansion. They point out that nearby private lands provide similar opportunities for this kind of development.

Personal/Social Benefits. In addition to the above contributions of the Wasatch-Cache National Forest to local communities, an additional aspect of values brought forward in many public comments should be acknowledged. This category we have labeled “personal/social benefits” and while difficult to describe, it is no less important to those who voiced concerns about it than

the items described above. Among the comments were statements about how the forest environment provides opportunities for families to bond, for escape from the crowded urban and work world hustle, for continuation of highly valued lifestyles and longstanding traditions, for nature's healing to the human imagination and spirit, for solitude, serenity, and spiritual renewal, and simply for the knowledge that wild places are wild and will remain that way. These comments cross the boundaries of groups advocating motorized or non-motorized access, commodity production or reduction/elimination of commodity production, and strongly differing world-views on the appropriate role of humans in stewardship of the forest. We heard advocates of both motorized and non-motorized access mentioning serenity or escape from urban hustle as values, and both groups expressed concern about crowding. Both commodity and non-commodity advocates voiced concerns about family, tradition, and caring for the land.

Issue 5 – Environmental, Social, and Economic Impacts of Uses

How will we ensure that impacts of uses to watershed conditions, terrestrial, riparian and aquatic wildlife and fish habitats, recreation settings and scenery, and local quality of life are kept within acceptable limits? Uses include livestock grazing, timber harvest, recreation, oil & gas development, and road and trail management.

The potential environmental and social impacts of various uses of the forest are of great concern to many people. They see the long-term planning process as a rare opportunity to look into the future and examine what kind of environmental and social legacy today's decisions will leave.

Recreation. There are concerns about effects on watersheds from off road vehicles, mountain bikes, facility development, and improper trash disposal; effects on wildlife/habitat from off road vehicles, facility development, human presence (both motorized and non-motorized), noise, packed snow trails; effects on fragile alpine and remote ecosystems from four season use in ski areas (mountain biking, hiking, large numbers of people, waste disposal), expansion of recreation into previously inaccessible areas associated with ski based resorts and with improved technology of snowmobiles; and effects on aquatic ecosystems from facilities, fish stocking (distribution of fishing use), and sediment from user-created roads; social impacts of recreation to local communities including increased demand for law enforcement and search and rescue, and changes to character of rural communities because of increasing numbers of recreation visits. Debates about the actual environmental impacts of various types of recreation are common. Debate and disagreement around the social impacts are even more contentious because impacts are a matter of human values and perceptions that vary greatly from person to person. Some people are also concerned that the Forest Service promotes commercial opportunities without consideration of local needs and long-term implications (i.e. difficulty removing any commercial use once established even though conditions change making the use less appropriate).

Livestock Grazing. There are concerns about effects on riparian and aquatic habitats, watershed conditions, upland vegetation, alpine habitats, and recreation experience. At the same time, beneficiaries of livestock grazing see the environmental and social impacts as acceptable and question the actual contribution of livestock grazing to negative environmental impacts.

Timber Harvest. People are concerned about impacts of road construction and harvest on visuals/scenery, fragmentation of forests, old growth habitats, wildlife and fish needs, and watershed health. Those who benefit economically from timber production while also concerned about sustainability of the forest, are skeptical about the actual negative environmental impact of this activity and its effects on other values of the forest.

Oil and Gas. Exploration and development there are concerns about effects on values associated with undeveloped areas.

Road and Trail Management. There are concerns about effects on watershed and aquatic habitats from erosion and sedimentation, and about effects of road and trail densities on wildlife/habitat connectivity.

Issue 6 – Appropriate Types and Amounts of Facility Development for Wildland Settings in the Forest

How much more recreation related facility development, where and of what types, should be allowed in the future?

Increasing recreation demand and the extent to which facility development is allowed or used to accommodate increased use is of concern to some people. Given current and expected growth in demand, there is concern that wildland settings may be compromised by too much or certain types of additional facility development. The kinds of facilities most often associated with recreation include ski resort improvements, campgrounds, picnic areas, overlooks, trailheads, parking areas, fishing access, boat launches, signing, visitor centers, and designated dispersed campsites.

Some people would prefer that growth in recreation be accommodated by construction of additional facilities. They see this as a way to further disperse visitors in more heavily used areas or to protect sites from heavy use through hardening and preventive services such as trash containers. They have also noted the need to include demographic considerations such as an aging population and accessibility for physically challenged as facilities are developed. Others prefer to see limitations on types and/or amounts of facility development, particularly in certain areas that already have numerous facilities such as the tri-canyon area of the Wasatch Mountains. Some would like to see approaches to recreation management other than new facility development. An example is advocating additional mass transit rather than building additional parking facilities. There are concerns that continually adding facilities may result in the loss of the special niche the Wasatch-Cache National Forest offers for recreation.

Other Topics And Issues Raised But Not Addressed

Several issues raised by the public and other agencies are not addressed in detail in this analysis. Issues are addressed in the analysis to the extent they relate to the decisions being made in a forest plan and the scope of the revision topics. A summary of the issues with the reason why they are not analyzed in detail follows.

Outside of Forest Service Authority

Wildlife Management. Some people commented on various aspects of wildlife management such as hunting restrictions, bear baiting practices, fish stocking practices, and the appropriateness of introducing non-native wildlife species or top carnivores. The State of Utah, not the Forest Service, has the authority for managing wildlife. The Forest Service works cooperatively with the State Division of Wildlife Resources and often makes recommendations for management in those instances where national forest resources are affected by its actions.

Predator Control. Some people commented that predator control should be eliminated. Predator control responsibilities have shifted since the last round of forest planning. Another agency of the Department of Agriculture, Wildlife Services now has the authority to make those decisions in cooperation with the Forest Service.

Listing of Canada lynx as threatened. Some people disagreed with the finding of the Canada lynx as threatened. The Endangered Species Act prescribes the authority of species listing to the United States Fish and Wildlife Service (USFWS), an agency within the Department of the Interior. Land management agencies such as the Forest Service work in consultation with the USFWS to define species conservation strategies.

RS 2477 road assertions of counties. Some people commented that the Forest Service should recognize all RS 2477 road assertions made by counties. At the present time the Forest Service does not have a mechanism by which it can administratively recognize public roads under RS 2477. Only a legal determination usually through a court action can actually establish an RS 2477 right of way. We are identifying asserted roads on maps and maintaining their status until a determination of their validity can be made.

Outside framework level of analysis

Site-specific issues. There were many comments about issues that are dealt with in project level decisions that implement the forest plan. In some cases comments pertained to current implementation of projects. Many people commented on travel management issues such as closure of specific trails, allocation of uses on trails, and signing, while others commented on specific locations where they believed new or improved facilities should be added for recreation users. There were also many comments about non-recreation issues such as removing a fence in a specific location.

The forest plan revision will identify general areas of the forest where various types of uses or facilities are appropriate. The forest plan does not make site-specific determinations of specific locations for those uses or facilities. The forest plan will not address specific route changes. Site-specific decisions are made in the future through project level analysis that must be consistent with the broad area direction established in the forest plan.

Administrative Actions. Many people commented on administrative issues such as the current and future levels of law enforcement needed, the appropriateness of partnerships to accomplish agency goals, and whether or not user fees should be charged for using the national forest.

The forest plan identifies goals and objectives for land management and outlines environmental measures to achieve these goals. However, the forest plan does not prescribe administrative actions. These types of issues are administrative aspects of implementing the forest plan and are not appropriate for inclusion in the forest plan itself.

Addressed by Regional Inventory Protocol

Definition of a road to establish roadless inventory. Several people thought the definition of what was considered a road established too high of standard thereby allowing inappropriate acreage to be included within the roadless inventory. The regional protocol for establishing roadless inventories was completed with public input considered in the final definitions. The Wasatch-Cache National Forest used the definition from the approved protocol.

Outside the scope of the Revision Topics

Communication sites and utility corridors. Some people believed additional commercial electronic sites and utility corridors should be designated to accommodate future use. The 1985 forest plan established ten utility corridors after an extensive review of industry needs. The forest currently has communication sites established that allow commercial use. Analyzing new areas for these uses requires a high degree of complexity and extensive involvement and coordination with private industry. These issues are currently not as pressing as some others necessary in the forest plan revision and will be addressed in the future as warranted.

Wild and Scenic River suitability determinations. Some people suggested that the forest plan revision was the proper context in which to address suitability of wild and scenic rivers. An inventory of the rivers on the Wasatch-Cache National Forest was completed in August 1999 in accordance with the National Wild and Scenic Rivers Act. Based on this inventory, 34 segments on the Wasatch-Cache were found eligible for inclusion. As allowed for in the National Wild and Scenic Rivers Act, the Wasatch-Cache will complete the suitability determination though a separate analysis at a later date rather than as part of the forest plan revision. The potential complexity of analysis required a degree of detail that would reduce resources available for other important revision decisions. Suitability is currently not as pressing a decision as some others necessary in the forest plan revision. In addition there is a backlog of rivers that have gone through the suitability process and have had no Congressional action for designation. As more national forests in Utah complete eligibility inventories, it might be possible to conduct suitability studies at a broader and more comprehensive statewide scale.

Until this analysis can be completed, the revised forest plan will provide for protection of the eligible river segments until the suitability determinations can be made and, if appropriate, designations are accomplished.

Addressed by Management Direction

Many people’s comments related to narrow aspects of management that would be addressed the same regardless of the alternative. These were not identified as issues used to develop the range of alternatives but instead will be addressed by management direction in the revised forest plan.

An example of this would be “wildland fire should comply with state and federal air quality standards”.

Recent National Direction Considered in the Revision Analysis

Several months prior to the Draft Environmental Impact Statement being published two new rules were issued establishing new national direction. The most recent direction concerning these rules is reflected in the Final Environmental Impact Statement.

The National Forest System Road Management Final Rule revises regulations concerning the management use and maintenance of the National Forest Transportation System. The final rule approved a new road policy that uses a science-based forest transportation system that meets the needs of the public yet minimizes or reverses the environmental impacts often caused by roads. The programmatic aspects of the new policy have been more fully incorporated into the Final Environmental Impact Statement.

The Roadless Area Conservation Final Rule establishes prohibitions on most road construction, road reconstruction, and timber harvesting in inventoried roadless areas on National Forest System lands. Presently, the Rule is being challenged within the federal court system. The Forest Service has initiated efforts to move forward with a responsible and balanced approach to re-examining the rule. For now, the Chief has instructed forests to ensure that Forest Plan revisions consider, as appropriate, the long-term protection and management of unroaded portions of inventoried roadless areas.

The terms of the Roadless Area Conservation Rule are applied to Alternatives 1, 2, and 6. Other alternatives consider the protection and management of inventoried roadless areas by varying degrees. All give full consideration of the values of each inventoried roadless area on the forest.

CHAPTER 2 - ALTERNATIVES

Introduction

This EIS explores the differences among a number of management alternatives for the Wasatch-Cache National Forest. These were developed to provide a range of options for the direction that forest management will take over the next 10 to 15 years. These alternatives are responsive to the needs for change ('Topics'), significant issues discussed in Chapter 1, and public comment on the Draft Environmental Impact Statement. However, given that some of the issues are highly polarized, no one alternative fully resolves all of them. Showing a range of approaches for addressing issues, along with differences, trade-offs, and projected effects is a key part of the environmental analysis process. This chapter is divided into the following sections:

- **Alternative Development** – discusses how the alternatives were developed.
- **Elements Common to All Alternatives** – describes features that are part of every alternative considered in detail.
- **Alternatives Considered in Detail** – describes the alternatives analyzed in depth.
- **Alternatives Considered But Eliminated From Detailed Study** – briefly describes alternatives that were considered, but not studied in detail and reasons why.
- **Comparison of Alternatives** – summarizes how the alternatives compare to one another.
- **The Preferred Alternative** – identifies the alternative currently preferred by the Responsible Official for implementation.

  IMPORTANT: Maps of Management Prescriptions, Recreation Opportunities (Summer and Winter) and Scenery Management **for each Alternative** are included in the map packet accompanying this document. These maps are essential to understanding each of the Alternatives.

Alternative Development

Range of Alternatives

As explained in Chapter 1, revision of the forest plan is based on the need to change the 1985 forest plan. The September 1999 "Proposed Action Wasatch-Cache National Forest Plan Revision" provided people with a first cut of what the Forest Service approach to revision might look like. Based on public responses to that proposal, the six issues detailed in Chapter 1 were identified. These, along with mapping and themes compiled from later public workshops formed the basis for a number of alternative approaches to address needs for change and issues in forest plan revision. Where possible, we identified specific geographic areas where each issue was most prevalent. This helped narrow the potential range of alternatives in some cases. We then

identified the outer ranges (maximum and minimum treatment) of potential alternatives for each issue, noting reasons for narrowing the range where that was appropriate. For example, although one end of the range of suggested options for ensuring biodiversity was to reintroduce historically native predators (while the other is the minimum of mitigating activities where threatened or endangered species are known to occur), we narrowed the range because reintroduction is not typically initiated by the Forest Service nor is it implementable by the Forest Service. Scope of current policy does not include this action. Instead, we used only actions that are within Forest Service authority to implement as the end of the range of options for biodiversity.

Public Review of Alternatives *Prior to the DEIS*

Five "Preliminary Alternatives" were then described in writing and provided to forest plan revision participants in August 2000. Each alternative was designed to respond to comments and significant issues in a different way, providing a range of possible management approaches from which to choose. Responses to this package were then compiled and used to further define, clarify, and improve the five alternatives as well as to add a sixth alternative completing the National Forest Management Act requirement that "The interdisciplinary team shall formulate a broad range of reasonable alternatives…" 36CFR 219.12(f).

Primary changes resulting from public comments on the Preliminary Alternatives included: adding more area as recommended wilderness to some alternatives; further restricting snowmobile access in some alternatives while adding snowmobile access in others; adding Special Interest Areas and/or Special Areas to some alternatives; protecting more inventoried roadless areas in some alternatives; allowing no timber harvest in one alternative; applying the National Roadless Area Conservation Rule to some alternatives and not to others; providing for more separation of winter recreation uses in some alternatives; adding emphasis on fuel management to some alternatives; rearrangement of permitted heli-ski areas in some alternatives; and adding recreation access as an emphasis in some alternatives in addition to Alternative 5.

Public Review of Alternatives *Included in the DEIS*

Six Alternatives were presented for public review and comment in the May 2001 Draft Environmental Impact Statement. These represented the range of reasonable alternatives developed with multiple rounds of public participation. Alternative 6 was identified as the Preferred Alternative. The comment period ended November 1, 2002 and we received 3,762 separate responses. Public comment specifically on Alternatives included many expressions of support for or opposition to each of the six alternatives. Some respondents felt that a wider range of alternatives should be considered. In particular some wanted to see more wilderness recommendation than the maximum in Alternative 1, a no grazing alternative, a wider variation in projected grazing outputs (AUMs), more variation in summer motorized access, specific areas of winter non-motorized access, and numerous other very specific variations on the six Alternatives presented.

The FEIS responds to these comments by changing several suggested roadless areas in the Ogden area to recommended wilderness in Alternative 1. The FEIS decreases suitable range (and consequent projected AUMs) for purposes of cutthroat trout habitat improvement in Alternative 2. All other aspects of the six DEIS alternatives remain the same. The reasons for not varying summer motorized access by alternative are explained in a subsequent section of this Chapter titled "Past Decisions Not Being Revisited in Plan Revision" under the subheading "Travel Management Plans" as well as in the last section of this Chapter "Alternatives Considered But Eliminated From Detailed Study". Reasons for not analyzing a no grazing alternative are also explained there.

An additional alternative, **Alternative 7**, was developed by modifying the original preferred alternative with careful consideration of the public comments and suggestions about the six draft Alternatives, and considering information on effects displayed in this FEIS. Among other changes from the original preferred alternative, Alternative 7 responds to the concerns for some separation of winter motorized and non-motorized uses to reduce conflicts as well as concerns about unsatisfactory rangeland conditions.

Application of the 2002 National Roadless Area Conservation Rule

A note about the current status of and how we have addressed the National Roadless Area Conservation Rule in this FEIS is warranted. At the point of fully developing our alternatives for the *DEIS* analysis, the process of public comment on the Rule was still in progress. By the time we were identifying and finalizing the *DRAFT* preferred alternative, previous Forest Service Chief Michael Dombeck issued a Record of Decision on the Roadless Area Conservation Initiative. Even at that time, there were several legal challenges being initiated. We ultimately applied the Rule to Alternatives 1, 2, and 6 in the DEIS.

This rule was subsequently selected for review by President Bush's Administration until at least May 12, 2001. In December 2001 Interim Direction was provided in the Forest Service Manual (FSM 1925.04a, id_1920-2001-1) to guide various activities affected by the Rule including Forest Planning. This direction reserved authority for certain decisions (roading and timber harvest) within roadless areas to the Chief of the Forest Service "until a forest-scale roads analysis is completed and incorporated into the forest plan" and "until a revision of a forest plan or adoption of a plan amendment that has considered the protection and management of inventoried roadless areas."

Therefore, Alternative 7, developed in response to public comment on the DEIS Alternatives 1-6, applies this direction rather than the Rule. This Alternative relies on the individual roadless area evaluation (FEIS Appendix C2) as the basis for applying management prescriptions to roadless areas. Many of the areas have prescriptions that maintain roadless values completely or mostly while some have prescriptions that allow development (see Chapter 4, Topic 5, under the heading "Effects on Roadless Area Values").

Assumptions About Budgets and Funding

Finally, alternative development was based on assumptions about budgets and funding. One of the learning experiences from the original forest planning efforts was that although plans should describe desired future conditions of the forest, they also must have some connection to reality. In many cases the plans projected outputs and accomplishments that could only have been achieved if funding was significantly increased in various resource program areas. These funding increases did not materialize and in many cases funding actually decreased over the years. Since the plans did not establish clear priorities within or between resource areas, implementation necessarily was sporadic for some resources while others with funding became the priority by default. Achieving balance was difficult.

Therefore, all alternatives (including the new Alternative 7) developed for this analysis are based on "experienced budget levels." The total budget allocation to the Wasatch-Cache National Forest was assumed to be similar to the average of several recent years. The mix of different types of funds (such as wildlife, recreation, or minerals) could be adjusted depending on the nature of the alternative but the total was viewed as a cap. There is one exception to this in the area of fire funding. Given the recent emphasis on fire and fuels in the National Fire Plan, we assumed that funding in this area will be significantly higher than experienced budget levels for other resources. Projections about activities related to fire and fuels reduction therefore are based on these higher funding levels. In the event that Congress emphasizes other programs through appropriations in the future, regardless of the alternative being implemented, a redistribution of priorities might result.

Also see the explanation of assumptions for projected activities and outputs in Table 2-2.

Elements Common to All Alternatives

Past Decisions Not Being Revisited in Plan Revision

Travel Management Plans have been developed for each ranger district or group of districts. These plans identify routes open for summer motorized use and areas or routes open for winter motorized use. Although this forest plan revision addresses winter motorized and non-motorized uses, the designated routes open for summer motorized use remain in place consistent with current Travel Plans for all alternatives. The single exception to this is when the motorized route is located within an inventoried roadless area that is recommended for wilderness designation (Prescription 1.5), in which case that route would be closed to motorized use. These are highlighted in the alternative descriptions in this Chapter beginning under the heading "Alternatives Considered in Detail."

Public comments and discussions after review and comment on the DEIS revealed needs for updating some District Travel Plans, particularly Ogden, Salt Lake, and Logan Ranger Districts. Given this need, an Objective was developed and included in the Revised Forest Plan to complete this work in the near future. Changes resulting from these site-specific Travel Planning analyses may require Forest Plan amendment, particularly if they affect Recreation Opportunity

Class mapping. This is an expected and appropriate type of adaptation of the Plan to changes in the future.

All alternatives also have in common **Utility Corridors and Electronic Sites.** The utility corridors and electronic sites identified in the 1985 forest plan remain as defined. They are to be treated as an overlay to the Management Prescriptions and integrated as much as possible with the prescription emphasis while providing for use of the corridor or site. (Direction for specific sites is included in Management Area Desired Future Conditions in the Revised Forest Plan).

The **1996 Rangeland Health Amendment** established forage and browse utilization standards, and ground cover standards as well as rangeland monitoring requirements. This forest plan amendment also described broad desired future conditions for four vegetation types: riparian, upland, aspen, and alpine. These items are retained in all alternatives and are incorporated into the Revised Forest Plan.

Based on public comment on the DEIS, several items have been added to the Revised Forest Plan to improve on the guidance developed in 1996. These include a Guideline for upland forage utilization on lands in unsatisfactory condition (G71), a Guideline for site-specific objective development (G75), and an Objective for Improved Rangeland Management.

The **1994 Oil and Gas Leasing** decision included leasing stipulations for 140,400 acres of the North Slope of the Uinta Mountains and is retained in all alternatives for forest plan revision. Existing leases (on about 19,000 acres) in the inventoried roadless area ("appeal settlement zone", see Topic 9 in Chapter 3) continue as they exist now until they expire at which time the record of decision for this plan revision will take effect for future availability and lease stipulations.

The **1997 High Uintas Wilderness Amendment** established desired future conditions, goals, standards and guidelines for that Wilderness area. These are incorporated in all alternatives and are included in the Proposed Forest Plan.

In response to public comment, some of the direction for the High Uintas, where we felt it was appropriate, has been applied to other designated wildernesses in the Revised Forest Plan to improve protection and management of those areas.

The 1999 Goshawk Amendment provided desired future conditions, goals, objectives, standards and guidelines for sustaining habitats for goshawk. The intent of these has been incorporated in the Revised Forest Plan and applies to all alternatives.

The 2001 Utah Fire Amendment amended all of the Forest Plans for the Utah National Forests to allow for prescribed fire and wildland fire use. Components of this amendment are incorporated in all alternatives except Alternative 1 (which does not allow prescribed fire) with one exception. Sensitive watersheds are removed from the list of exceptions to wildland fire use because these watersheds may include barriers to fire spread that could be used as acceptable wildland fire use perimeters. We will analyze sites specifically to determine whether to include portions of sensitive watersheds in areas approved for wildland fire use.

Comments on the DEIS expressed concern about needed **motorized** access under permit to administer various on-going uses (such as weather stations, reservoir/ditch maintenance, and livestock grazing operations). In response a Guideline has been added to the Revised Forest Plan to incorporate authorization for these types of access into permits where public motorized access may not be allowed.

Common Framework for Alternatives Considered in Detail

Before reviewing the seven Alternatives for this FEIS, a quick review of how they will be described is necessary. To understand any one of the alternatives the reviewer must look at a series of maps as well as written descriptions.

Management Areas are the same delineation of seven groupings of watersheds across the forest for each alternative. They are described narratively and shown on a map in the introductory section of Chapter 3 of this FEIS. They include Bear, Cache-Box Elder, North Wasatch-Ogden Valley, Central Wasatch, Stansbury, Western Uintas, and Eastern Uintas. Management Areas are the place where forestwide direction must be integrated with the capabilities and sensitivities of the land, as well as the needs and opportunities there. These areas are places recognizable by people that use and are interested in the area.

Forest Management Direction:

The National Forest Management Act requires us to develop management direction for each National Forest. This "direction" is to be expressed through goals, objectives, standards, guidelines, management prescriptions, desired future conditions, and monitoring and evaluation requirements for the forest. Some direction logically can be applied to an entire national forest, while other direction should apply only to specific areas of the forest. For this reason, **maps** are used with this FEIS to show where particular direction would apply by alternative. Management prescriptions, recreation opportunities (summer and winter), scenery management, and oil and gas leasing availability are mapped for each alternative analyzed in detail. These maps, along with the narrative descriptions later in this Chapter (under "Alternatives Considered in Detail"), are the basis for describing the key choices made in each alternative and displaying important differences between the alternatives.

The set of maps for each alternative are best understood by first reviewing the standardized categories and descriptions that go with each map legend. **FEIS Appendix D** provides detailed descriptions of the categories. Following are very abbreviated versions of these descriptions to introduce the concepts used in mapping. Management Prescriptions define the primary land allocation with the other three maps further defining direction for a given land area. In most instances the map layers are compatible by design. However, in the instance of a conflict between direction for a Management Prescription and any of the other layers, the Management Prescription takes precedence.

The maps and their accompanying descriptions for the selected Alternative (7) are a key part of the Revised Forest Plan.

Management Prescription Categories

The **Management Prescription Categories** listed below (Appendix D for detailed descriptions) provide a sense of the management or treatment of the land that is intended to result in a particular condition being achieved or value(s) maintained. The category numbers below correspond to the numbers on the **Management Prescription Maps** for each of the seven alternatives. However, prescription categories do not stand alone. They are one part of a management direction that also includes Desired Future Conditions, Goals, Objectives, Standards, Guidelines, and Monitoring and Evaluation Requirements. Where an activity is allowed by Prescription, standards and guidelines provide specific parameters within which the activity must be managed.

1.0 Wilderness

- 1.1 Existing Wilderness - Opportunity Class I
- 1.2 Existing Wilderness - Opportunity Class II
- 1.3 Existing Wilderness - Opportunity Class III
- 1.4 Existing Wilderness - No Class
- 1.5 Recommended Wilderness

2.0 Special Management Areas

- 2.1-2.3 Wild, Scenic, and Recreational Rivers (not used on revision maps)
- 2.4 Research Natural Areas
- 2.5 Scenic Byways
- 2.6 Undeveloped Areas
- 2.7 Special Interest Areas and Special Areas

3.0 Protection, Maintenance or Restoration of Aquatic/Watershed or Terrestrial Integrity

- 3.1 Aquatic Habitat/Watershed Emphasis (A - Aquatic, W - Watershed, **Alt. 7 only**)
- 3.2 Terrestrial Habitat Emphasis (D - Development allowed, U - Undeveloped, **Alt. 7 only**)

4.0 Multiple Resource Uses With Recreation Needs and Opportunities

- 4.1 Emphasis on Backcountry non-motorized recreation settings
- 4.2 Emphasis on Dispersed non-motorized recreation settings
- 4.3 Emphasis on Backcountry Motorized recreation settings
- 4.4 Emphasis on Dispersed Motorized recreation settings
- 4.5 Emphasis on Developed Recreation Areas

5.0 Multiple Resource Uses With Forested Vegetation Management Needs and Opportunities

- 5.1 Emphasis on maintaining or restoring forested ecosystem integrity while meeting multiple resource objectives
- 5.2 Emphasis on managing timber for growth and yield while maintaining or restoring forested ecosystem integrity

6.0 Multiple Resource Uses With Rangeland Vegetation Management Needs and Opportunities

6.1 Emphasis on maintaining or restoring non-forested ecosystem integrity while meeting multiple resource objectives

6.2 Emphasis on managing for livestock forage production while maintaining or restoring non-forested ecosystem integrity

7.0 Intermingled Public/Private Lands *(This prescription accompanied one of the other prescriptions in earlier versions. It has been eliminated because it made maps difficult to read and because private lands are already shown clearly on the maps.)*

8.0 Concentrated Development Areas

8.1 Mineral Development Emphasis

Allowed Activities by Management Prescription

For each alternative described later in this Chapter, a list of Management Prescriptions and Allowed Activities is provided accompanied by a series of tables. These show eight types of forest management activities and whether or not each would be allowed in the areas mapped with that prescription for that alternative. The following explanations should be referenced for better understanding of the allowed activities.

Allowed Activities Explanations

Timber Harvest refers to commercial removal of vegetation for a variety of purposes including providing raw wood materials, improving wildlife habitat, adjusting age class distribution to mimic historic disturbance regimes, providing fire-resistant landscapes and commercial thinning. Timber harvest may be used to salvage trees or stands substantially damaged by wind, fire, or other significant disturbance; reduce susceptibility to insects and disease; or to develop stand structures that meet the desired future conditions, provided this can be done in harmony with the management emphasis for the area.

Vegetation/Fuel Treatment refers to a host of activities including, thinning; seeding; planting; mechanical treatments such as cutting by hand with chainsaws; cutting using tracked equipment or equipment on wheels for roller-chopping, chaining, crushing, or chipping; chemical application; and biological treatments (i.e., specialized grazing regimes). These are methods used to achieve a broad range of multiple-use objectives including maintaining or restoring healthy ecosystems, reducing likelihood of unwanted wildfire, removing public safety hazards, reducing potential for high-intensity wildfires and resulting erosion, improving forage or browse production, restoring native plant communities, improving or restoring watersheds, and providing for specific elements of terrestrial or aquatic wildlife habitats.

Prescribed Fire refers to any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and site-specific NEPA analysis requirements must be met prior to ignition. Prescribed fire plans are docments prepared by qualified

personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription). Prescribed fire activities include actuallly lighting a fire using a fire accelerant with ground or aviation equipment and personnel; and may include the following: removal or piling of vegetation to secure perimeter lines, clearing areas for helicopter operations, clearing holding lines to bare mineral soil using hand tools or heavy eqiupment (i.e., bull dozers), using fire resistant foam or water on holding lines, constructing temporary camps for base operations, using aviation resources for fire retardant or water drops to reduce high-intensity fire behavior, closing areas to livestock grazing before and after burning, and closing roads and areas to the public before and after burning.

Wildland Fire Use is the management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in the Fire Management Plan. The term does not include fires that are human-caused (either accidental or arson) and are considered unwanted wildland fires and that must be suppressed. It also does not include the use of those fires that are management ignited, referred to as prescribed fires. Use of wildland fire requires a Wildland Fire Implementation Plan which is a progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Road Construction refers to activity that results in the addition of forest classified or temporary road miles. **Road** is defined as a motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary (FSM 7705).

Note: Where road construction is <u>not allowed</u> by a Management Prescription the responsible official may authorize road construction or reconstruction when:

a. A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event, that without intervention would cause the loss of life or property;
b. A road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to conduct a natural restoration action under CERCLA, section 3d11 of the Clean Water Act, or Oil Pollution Act;
c. A road is needed pursuant to reserved or outstanding rights, or as provided by statute or treaty; or
d. Realignment is needed to prevent irreparable resource damage by a classified road. The road must be deemed essential for public or private access, natural resource management, or public health and safety, and the resource damage associated with the road cannot be corrected by maintenance.

New Trail Construction refers to development of any “pathway for foot, horse, or trail vehicles” (bikes, scooters, snomobiles, and all terrain vehicles [motorized OHV 50” or less] (FSM 2305.05, WO Amendment 2300-94-3, 7/8/94, pg. 8-9 and FSH 2309.18 WO Amendment 2309.18-91-2, 11//8/91 pg. 1-2). To determine whether a trail is open to motorized or mechanized uses refer to District Travel Management Plans.

Note: In Prescriptions where new trail construction is not allowed, reconstruction and/or realignment to correct resource impacts from existing trails is allowed.

Grazing refers to eating of forage by permitted livestock managed under an approved Allotment Management Plan and terms of a livestock grazing permit. Forestwide and management prescription standards and guidelines provide direction for grazing management until site-specific desired conditions and/or objectives can be developed. Grazing may also include use of livestock under contract to reduce fuels.

New Recreation Development refers to major structural public use facilities such as campgrounds and trailheads. It does not refer to construction within already established developed recreation sites. Trails and single restrooms are not considered recreation development for these descriptions.

Changes to Prescriptions Between Draft and Final

Comments on the DEIS expressed concerns about the real intent behind some of the management prescriptions and their "Generally Allowed Activities". There was confusion about whether the word "generally" would in essence negate the intent of stating that an activity was not allowed. The word generally has been removed from all allowed activities tables. The Allowed Activities Explanations above have been improved to distinguish between different types of vegetation treatments. In addition, new trail construction has been added to both the explanations and tables for each alternative.

There were also questions about conditions that might be placed on some activities because of the emphasis in the prescriptions. Given the need for better clarity during future implementation, the Revised Forest Plan replaces the allowed activities tables with corresponding standards and guidelines better reflecting intent for allowed activities in each management prescription (see Revised Forest Plan, Chapter 4A.5).

Finally, for Alternative 7 only, several new subcategories of prescriptions have been added to address comments and to adapt to evolving roadless area management direction. In Alternative 7 only, 3.1 is subdivided into Aquatic Habitat (3.1A) and Watershed Emphasis (3.1W) and 3.2 is subdivided into Terrestrial Habitat Emphasis Undeveloped (3.2U) and Developed (3.2D).

In addition, for Alternative 7 only, the prescription for recommended wilderness (1.5) allows two activities for interim management not allowed in other alternatives under this prescription. These are 1) prescribed fire to return fire dependent vegetation types to properly functioning conditions, and 2) existing snowmobiling until such time as Congress acts, to balance needs for closing other areas.

Recreation Opportunities Summer

Recreation Opportunity Spectrum (ROS)

The Recreation Opportunity Spectrum (ROS) is a system of inventory and mapping of different types of recreation settings. These range along a scale from least developed (facilities, etc.) and most remote to most developed and least remote. Listed below is a brief explanation of the eight classes applied to each alternative in this analysis. Maps in the accompanying map packets show these recreation allocations for summer and how they vary by alternative. It is important to recognize that these maps are NOT Travel Management Maps and do not show which routes are designated as open to motorized uses. A ROS Class of motorized may be the result of motorized routes nearby but off National Forest and influencing the recreation setting on National Forest. FEIS Appendix D provides a more detailed description of the classes and FEIS Appendix B includes a discussion on how the system was applied to the analysis.

Wilderness/Primitive
Designated Wilderness; very high probability of solitude; closeness to nature; self-reliance, high challenge and risk; little evidence of people; Natural Evolving Landscape Character Theme.

Wilderness/Semi-Primitive Non-Motorized
Designated Wilderness; high probability of solitude; closeness to nature; self-reliance high and moderately high challenge and risk; some evidence of others; Natural Evolving Landscape Character Theme.

Recommended Wilderness/Semi-Primitive Non-Motorized
Recommended Wilderness; high probability of solitude; closeness to nature; self-reliance high and moderately high challenge and risk; some evidence of others; Natural Evolving Landscape Character Theme.

Semi-Primitive Non-Motorized
High probability of solitude; closeness to nature; self-reliance; high to moderate challenge and risk; some evidence of others; Natural Appearing Landscape Character Theme.

Semi-Primitive Motorized
Moderate probability of solitude; closeness to nature; high degree of challenge and risk using motorized equipment; evidence of motorized equipment on trails and primitive roads, and by audible motor sounds; Natural Appearing Landscape Character Theme.

Roaded Natural
Moderate evidence of human sights and sounds; moderate concentration of users at campsites; little challenge or risk; Natural Appearing and Developed Natural Appearing Landscape Character Themes.

Rural
Opportunity to be with people is accepted and desirable as is facility convenience, little challenge or risk except for activities like downhill skiing; high interaction among users; Developed Natural Appearing and Resorts Natural Setting Landscape Character Theme.

Urban
Opportunity to be with others is very desirable as is facility convenience; challenge and risk are unimportant except for competitive sports, high interaction among people; Resorts Natural Setting/Water Recreation Rural Appearing Landscape Character Theme.

Changes to ROS Application Between Draft and Final and Relationship to Travel Planning

Comments on the DEIS raised questions about how ROS mapping was intended to be used in the future when Travel Management Plans are updated. People wanted to know whether a mapped ROS Class such as Semi-Primitive Non-Motorized would preclude consideration of additional motorized routes in that area, for example to develop a loop between existing motorized routes. Likewise, people asked if an area is mapped as Semi-Primitive Motorized because of an existing motorized trail, would that trail be precluded from consideration for closure and return to non-motorized status because of the ROS Class? These excellent questions resulted in re-examination of how ROS was to be used and what its relationship is to Travel Management Planning. Our conclusion was this: ROS Maps will provide direction for managing recreation settings *until such time that Travel Management Plans are updated through site-specific analysis*. As Travel Plans are updated, that analysis can include alternatives that would require amendment of the Forest Plan ROS Maps. In other words, *ROS Mapping necessarily follows Travel Management Plan updates*, rather than preceding them or precluding certain changes to them. This ensures that a range of options can be considered at the site-specific level, which is the appropriate scale for decision making on designated open travel routes.

Winter Recreation Classes

Four classes were defined for allocating areas to winter recreation. These are very similar to the classes listed above for summer, but with several of the classes combined for simplicity. These are **Wilderness, Non-Motorized, Motorized, and Heliski**. These winter allocations are shown on maps (available in accompanying map packets), and vary by alternative. (See Appendix D for detailed descriptions of the Winter Recreation classes.)

Scenery Management System (SMS)

The Scenery Management System (SMS) is an inventory and classification system for identifying landscape character themes and setting objectives for management of scenery. Listed below is a brief explanation of six “landscape character themes”. These were assigned to the various areas of the forest by alternative. “Scenic integrity” is simply a qualitative measure of how well the landscape matches its character theme. High integrity means that given the character theme, for example “natural appearing”, management actions, such as facility

construction or vegetation treatment, should not result in obvious deviations from the expected appearance. Low integrity on the other hand would allow for some significant deviations from the expected appearance. Integrity objectives are assigned to areas of land on maps in the accompanying map packets. These vary by alternative primarily based on management prescriptions. FEIS Appendix D provides a more detailed description of the Scenery Management System and FEIS Appendix B includes a discussion on how the system was applied to the analysis.

Natural Evolving Landscape Character Theme
The natural evolving landscape character originates primarily from natural disturbances and succession of plants, with subtle changes due to indirect human activities. The existing landscape character generally continues to change gradually over time through natural processes.

Natural Appearing Landscape Character Theme
The existing landscape character has been influenced by both direct and indirect human activities, but appears natural to the majority of viewers. Natural elements such as native trees, shrubs, grasses, forbs, rock outcrops and streams or lakes dominate the views. While there is evidence of human influence from historic use, campgrounds, small organization camps, rustic structures and management activity, it would appear to be part of the landscape to the majority of viewers.

Developed Natural Appearing Landscape Character Theme
This landscape character theme is characteristic of National, National Forest and State scenic byways with development, and developed and dispersed recreation facilities within the foreground of the viewshed (1/2 mile). In these areas, the roadway, recreation amenities, and development are anticipated features in the landscape. For users these amenities are part of the valued natural appearing landscape. Users of these amenities are attracted to the natural appearing landscape, but desire a moderate to easy interaction with the landscape through the use of these amenities.

Resort Natural Setting Landscape Character Theme
This landscape character theme is characteristic of developed recreation facilities such as ski resorts, and recreation resort communities. In these areas recreation amenities are the main attraction for people and why they come to an area. Facilities are designed and constructed to harmonize with the natural setting, rather than to contrast with that setting. While the facilities in the base areas are dominant, that dominance declines as it transitions onto the mountainsides up to the ridgelines. Likewise, recreational opportunities provided in base areas rely more heavily on constructed facilities, while those higher on the mountain become increasingly oriented toward the natural setting.

Water Recreation Rural Appearing Landscape Character Theme
This theme is characteristic of the Pineview Reservoir recreation complex. The scenic qualities of Ogden Valley attract visitors, and maintaining rural character is important to many landowners in this area. In these areas recreation amenities are the main attraction for people and why they come to an area. The cultural setting of farms, fields, and pastures, influences

development on the private lands, housing, businesses, roads and other developments, [dominate some views].

Natural Landscape Character Theme (Alternative 4 only)
The natural landscape character originates primarily from natural disturbances and succession of plants, with subtle changes due to indirect human activities. The existing landscape character generally continues to change gradually over time through natural processes. Each degree of change in integrity changes the integrity level. The degree of visual alteration is measured in terms of visual contrast with the surrounding natural landscape.

Alternatives Considered in Detail

There are two sections of information about the seven alternatives. First there are **Individual Alternative Descriptions**. After these descriptions, there are a series of tables that summarize key information for all alternatives allowing a quick **Comparison of Alternatives**, their similarities and differences.

Individual Alternative Descriptions:
Each alternative is presented in the same format with the following components.

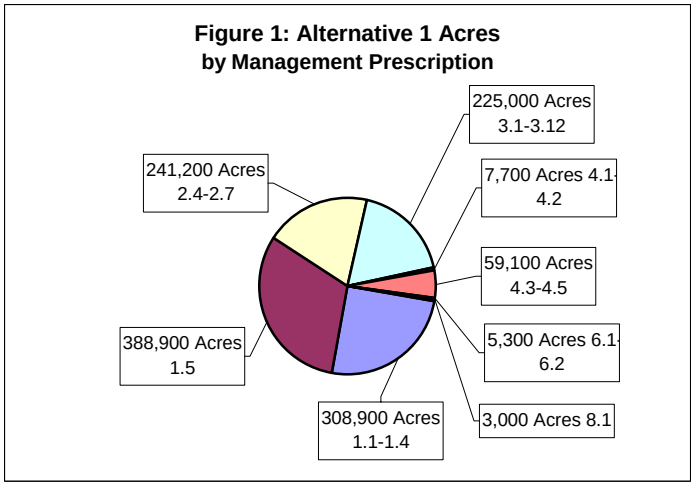
- **Background/Theme** – explains the general aim and a brief overview of the alternative.
- **Response to Issues** – describes how the alternative addresses the significant issues described in Chapter 1. Issue 5- impacts of uses, is addressed in-depth within Chapter 3 of this FEIS, where the consequences of each alternative are displayed.
- **Alternative Acres by Prescription Category –** is a pie chart showing the relative amounts of each management prescription category in acres for that alternative.
- **Management Prescriptions and Allowed Activities** – displays tables showing Allowed Activities by prescription for each alternative. Alternatives 2, 3, and 6 show these allowed activities for within and outside of inventoried roadless areas whereas Alternatives 1, 4, 5, and 7 do not have different allowed activities inside or outside of inventoried roadless areas.
- **Maps** – of each alternative and the corresponding prescriptions, recreation opportunities and scenery objectives are included in the map packets accompanying this document. It may be helpful to open the maps and use them as a reference as you read the particular alternative description.

Comparison of Alternatives:

- **Tables –** are provided beginning on page 2-XX displaying key differences between alternatives for management prescriptions, projected activities and outputs, suitable lands, recreation opportunities, disposition of roadless areas, and revenues and payments to counties for each alternative.

Alternative 1

Background/Theme



Alternative 1 addresses concerns about a need for very strong emphasis on allowing nature to take its course, minimizing human interference with natural processes, maintenance of roadless landscapes, and restrictive approaches to sustainability forest-wide, given many unknowns. By "restrictive" we mean that human uses are only allowed when and where they are consistent with this emphasis. Current levels of development are maintained, but not increased. No timber harvest is allowed nor is any road construction or reconstruction in inventoried roadless areas. Specific activities needed to reduce impacts of existing development (for example realignment of eroding trails) are allowed. Expected commodity outputs compared with other alternatives are lower.

Recreation opportunities are managed to allow a diversity of settings consistent with Forestwide Goals for watershed health, biodiversity and species viability, and ecological status, benchmarks, and reference areas. Winter motorized use is more restricted than currently. Snowmobiling is not allowed in inventoried roadless areas and where special habitat needs are present. Snowmobile routes on roads that have been cherry stemmed into roadless areas are open. User densities are managed (potential permit systems) in ROS classes primitive and semiprimitive. This alternative maintains all areas that currently meet criteria for semiprimitive and primitive recreation opportunities.

Response to Issues

Alternative 1 addresses the issue of **recreation use conflicts and access management** consistent with priority placed on goals for watershed health, biodiversity and species viability, and protection of special areas. Motorized uses are restricted more than currently because no snowmobiling is allowed in recommended wilderness and inventoried roadless areas. Areas closed to winter motorized uses because of critical big game winter range total 222,800 acres or 18% of total Forest acres. Heli-skiing is not allowed because much of the suitable terrain is recommended as wilderness. Within inventoried roadless areas, summer motorized recreation is allowed on routes designated as open in current travel maps except within areas recommended as wilderness. In these areas, about 76 miles of trail and two miles of road currently open to motorized uses would be closed to motorized use and rehabilitated or returned to vegetation. Mapped semiprimitive and primitive ROS classes (both motorized and nonmotorized) would be managed (potential permit system) to maintain low user densities. *See Comparison of Alternatives Tables 2-4, 2-5 for comparisons of different recreation opportunities.*

Alternative 1 addresses the issue of inventoried **roadless area management** with a prohibition on road construction, reconstruction, and timber harvest that maintains 100 percent of inventoried roadless areas as undeveloped. Areas recommended for wilderness (prescription 1.5) are shown in dark green on the maps in the map packets. The majority of acres of roadless areas with high quality wilderness characteristics are recommended consistent with the view that these areas deserve wilderness designation to protect those values in perpetuity. Portions of several roadless areas in the Ogden Ranger District (Willard, Lewis Peak, Burch Creek, and Francis) were added to the recommended wilderness in this Alternative based on public comment. About 388,900 acres, or 64 percent of inventoried roadless acres are recommended for wilderness designation. Remaining inventoried roadless areas are managed according to the mapped prescription with allowed activities defined specifically for Alternative 1. Allowed activities are shown in tables following this narrative. *Also see Comparison of Alternatives Table 2-6.*

Alternative 1 addresses the issue of **ensuring biodiversity and species viability (including watershed functions)** by emphasizing natural processes with minimal human intervention as follows:

a. Identify a system of areas representing all native ecological units and seral stages across their historic range of variation and allow nature to take its course.
b. All known wildlife corridors protected (regionally significant Bear River and currently designated western portion of East Fork Smiths Fork Uinta Mountains).
c. No interference with natural dynamics of vegetation including no timber harvest, no mechanical fuel reductions, no prescribed fire or unwarranted suppression of fire – (except that required to protect life and property). Allowing natural fires within prescription (wildland fire use) is acceptable and the natural role of insects and disease is allowed to play out.
d. Manage livestock grazing (including eliminating or reducing where necessary) to restore proper functioning of watersheds, riparian areas, lands in unsatisfactory condition (i.e. not meeting objectives) and to maintain or restore biodiversity. Close all vacant allotments including 3 for bighorn sheep habitat.
e. Manage recreation activities (including eliminating or reducing where necessary) to restore proper functioning of watersheds, riparian areas, and lands with recreation caused detrimental soil disturbance (this includes realignment of trails where needed).
f. Maintain all inventoried roadless areas as undeveloped and minimize human interference/intrusion.
g. Road decommissioning (closure, rehabilitation and revegetation) is pursued consistent with Travel Maps and priority placed on improving water quality, fish habitat, and reduction of habitat fragmentation.
h. Maintain connectivity of unfragmented forested lands or restore connectivity with minimum human interference.
i. Discourage introductions of non-native species.
j. Allow only biological control or hand-removal of noxious weeds.
k. Provide natural habitat protection for all species to include invertebrates, reptiles, amphibians, neotropical migrants, and plants, as well as species identified as threatened, endangered, or sensitive.

l. Protect and or restore special habitats (3 grazing allotments in the Uinta Mountains would be phased out from allotment status if permits are voluntarily waived without preference, to provide for bighorn sheep habitat).
m. Existing Research Natural Areas are maintained (Mollens Hollow, Morris Creek, Red Butte). Realign the lower portion of Red Butte Research Natural Area making the lower part a Special Interest Area; include additional acreage with current Morris Creek RNA.
n. Designate special interest areas in Willard Basin, and lower Logan Canyon for botanical values, and the T.W. Daniels Experimental Forest for educational purposes.

Alternative 1 addresses the issue of concerns about **economic contributions and social benefits of the forest** through recognizing non-commodity values such as water quality, air quality, natural ecological functions, and perpetuation of species along with commodity output measures of value. The land base is considered not suited for timber production and timber harvest is not allowed. Livestock grazing is managed on suitable rangelands, to meet standards associated with habitat needs. In both riparian and upland areas with unsatisfactory conditions, where movement of livestock or other non-structural means cannot accomplish satisfactory conditions (based on monitoring), livestock would be removed. Vacant allotments are removed from allotment status, including three that provide bighorn sheep habitat. Oil and gas leasing is limited to currently available lands (1994 Leasing Decision) with the remaining appeal settlement zone[1] not available for lease after current leases expire. Recreation related opportunities for economic benefits are tied to semiprimitive and primitive ROS classes (outfitter guiding may be included in management of user densities) and areas currently devoted to roaded natural and rural categories (concessions, ski areas). Ski area boundary expansions are not allowed nor are new ski areas. Commodity outputs are expected to be lower in this Alternative than in the others. *See Comparison of Alternatives Tables 2-2 and 2-7.*

Alternative 1 addresses the issue of **appropriate types and amounts of facility development** by allowing no additional facility development except to replace current facilities that have unacceptable impacts to resources and that do not increase user densities. No new trails are allowed, although realignment of existing trails to reduce resource impacts is allowed. Facilities at ski areas would be consistent with the Resort Natural Setting landscape character theme. ROS categories Urban and Rural are not expanded beyond current acres.

[1] About 68,300 acres being analyzed for oil and gas leasing within the Western and Eastern Uinta Mountains Mangement Areas are referred to as the Appeal Settlement Zone, see Chapter 3 Topic 9.

Management Prescriptions and Allowed Activities for Alternative 1

Prescription Category 1: Wilderness, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire[2]	Road Building	Grazing[1]	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.5	No	No	No	No	Yes	Yes	No	No

[1] As allowed under the 1984 Utah Wilderness Act

[2] Only to meet Wilderness Objectives

Prescription Category 2: Special Management Areas, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	No	No	No	No	Yes	No	No
2.5	No	No	No	No	Yes	Yes	No	No
2.6	No	No	No	No	Yes	Yes	No	No
2.7	No	No	No	No	No	Yes	No	No

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1-3.2	No	No	No	No	Yes	Yes	No	No

Prescription Category 4: Recreation Needs and Opportunities, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1-4.4	No	No	No	No	No	Yes	No	No
4.5	No	No	No	No	Yes	No	No	No

Prescription Category 5: Forested Vegetation Needs and Opportunities, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1	No	No	No	No	Yes	Yes	No	No
5.2	NA	NA	NA	NA	NA	NA	NA	NA

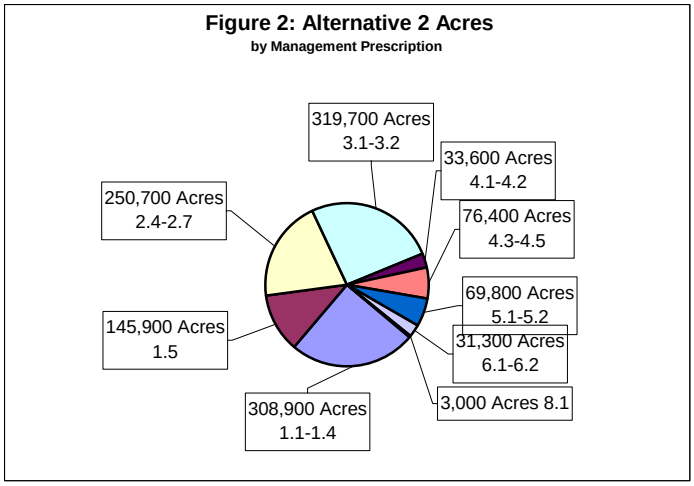
Prescription Category 6: Rangeland Vegetation Needs and Opportunities, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1	No	No	No	No	Yes	Yes	No	No
6.2	No	No	No	No	Yes	Yes	No	No

Prescription Category 8: Concentrated Development Areas, Alternative 1

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	No	No	No	Yes	Yes	No	No	No

Alternative 2



Background/Theme

Alternative 2 addresses concerns about a need for strong emphasis on biodiversity, mimicking or restoring natural processes with active human management, conservation of large roadless areas, and moderate approaches to sustainability given many unknowns. Uses are allowed when and where they are compatible with achieving restoration emphasis or maintaining properly functioning conditions. In inventoried roadless areas, no road construction or reconstruction is allowed and timber harvest is strictly limited consistent with the National Roadless Area Conservation Rule. Expected commodity outputs may be irregular in their timing with possible spikes of high and low outputs.

Recreation opportunities are managed to improve critical habitat, recover rare species, and where possible, provide for some increasing demands consistent with Forestwide Goals for watershed health, biodiversity and species viability, and ecological status, benchmarks, and reference areas. An overall diversity of recreation settings is maintained. Where inventoried roadless areas are recommended for wilderness or are next to existing wilderness, snowmobiling is not allowed. Snowmobile routes on roads that have been cherry stemmed into inventoried roadless areas are open. Within inventoried roadless areas, summer motorized recreation is allowed on routes designated as open in current Travel Maps except for those within areas recommended as wilderness. This alternative maintains 90 percent of currently mapped primitive and semi-primitive recreation opportunities.

Response to Issues

Alternative 2 addresses the issue of **recreation use conflicts and access management** by allowing winter motorized use in those areas where that use does not compromise existing and recommended wilderness. Conflicts between winter motorized and non-motorized uses are resolved through identification of most desirable snowmobiling and cross-country skiing areas, analysis of overlaps and determination of areas to separate these uses. These are overlaid with highest priority areas for protection/conservation and restricted accordingly. Areas closed to winter motorized uses because of critical big game winter range total 222,100 acres or 18% of total Forest acres. Heli-skiing is not allowed because much of the suitable terrain is recommended as wilderness. Within inventoried roadless areas, summer motorized recreation is allowed on routes designated as open in current Travel Maps except for those areas recommended as wilderness. In these areas, about eight miles of trail currently open to motorized uses would be closed to motorized use. Mapped semiprimitive and primitive ROS categories (both motorized and nonmotorized) are managed (potential permit system) to maintain

low user densities. *See Comparison of Alternatives Tables 2-4, 2-5 for acres of different recreation opportunities.*

Alternative 2 addresses the issue of **roadless area management** by adjusting allowed activities for management prescriptions with application of the National Roadless Area Conservation Rule. Road construction and reconstruction are not allowed in inventoried roadless areas nor is cutting, sale, and removal of timber except: for the cutting, sale or removal of generally small diameter trees which maintains or improves roadless characteristics *and* 1) to improve habitat for threatened, endangered, proposed, or sensitive species, or 2) to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. The only development allowed in inventoried roadless areas is for recreation facilities in prescriptions 4.4 and 4.5 (about 20,600 acres). About 145,900 acres or 24 percent of inventoried roadless areas with highest quality wilderness characteristics are recommended for wilderness. This is because of the need for active management of vegetation (primarily through use of prescribed fire that is not allowed in recommended wilderness) in order to return landscapes to properly functioning conditions in remaining roadless areas. *See Comparison of Alternatives Table 2-6 for disposition of roadless areas.*

Alternative 2 addresses the issue of **ensuring biodiversity and species viability (including watershed functions)** by emphasizing factors known to contribute to conservation biology with active human intervention as follows:

a. Identify current or manage to create a system of areas representing all native ecological units and seral stages across their historic range of variation.
b. All known wildlife corridors managed to maintain function of corridor (regionally significant Bear River and currently designated western portion of East Fork Smiths Fork Uinta Mountains).
c. Manage and/or restore rangelands and manage livestock grazing (including eliminating or reducing where necessary) to restore proper functioning of watersheds, riparian areas, and lands in unsatisfactory condition. All vacant allotments are closed including 3 for bighorn sheep habitat. Remove 26,000 acres of watershed in unsatisfactory condition from rangeland suitability to improve cutthroat trout habitat.
d. Active vegetation management (prescribed fire, wildland fire use, suppression of fire for protection of life and property, timber harvest, thinning, mechanical treatment of fuels, and seeding with native species) is emphasized to more quickly move landscapes to within the historic range of variability and to mimic natural disturbance processes including insects and disease.
e. Maintain inventoried roadless areas as undeveloped.
f. Road decommissioning is pursued as consistent with Travel Maps and priority placed on improving water quality, fish habitat, and reduction of habitat fragmentation.
g. Take aggressive actions to eradicate noxious weeds.
h. Maintain or restore connectivity of forested lands.
i. Discourage introductions of non-native species.
j. Monitor and assess for viability groups of species identified as focal species (categories of species used to assess ecological integrity).

j. Protect and or restore special habitats (3 grazing allotments in the Uinta Mountains would be phased out from allotment status if permits are waived without preference, to provide for bighorn sheep habitat).
k. Encourage restoration of native cutthroat trout to key drainages (Hayden Fork, Whitney, Temple Fork, Beaver Creek, Causey, South Fork Weber, Smith-Morehouse).
l. Existing Research Natural Areas are maintained (Mollens Hollow, Morris Creek, Red Butte). Realign the lower portion of Red Butte Research Natural Area creating a Special Interest Area; include additional acreage with current Morris Creek RNA.
m. Designate special interest areas and/or special areas in portions of the Wasatch Front Tri-canyon area for watershed, recreation and scenery purposes; and Willard Basin and lower Logan Canyon for botanical values.

Alternative 2 addresses the issue of concerns about **economic contributions and social benefits of the forest** through using opportunities for economic benefit from active management while focusing on objectives for biodiversity, species viability, and watershed health. Values for water quality, air quality, natural ecological functions, and perpetuation of species, as well as administrative and environmental costs of commodity outputs are recognized and included. Some forested lands are identified as suitable for timber harvest where that activity can be used to achieve habitat objectives and/or to mimic natural disturbance processes. Livestock grazing is managed on suitable rangelands to meet standards associated with habitat and watershed needs. In areas with unsatisfactory conditions, where movement of livestock or other structural means cannot accomplish satisfactory conditions (based on monitoring), livestock will be removed until satisfactory conditions are achieved. Vacant allotments are removed from allotment status. Lands recommended as wilderness within the appeal settlement zone in the Uinta Mountains are not available to lease for oil and gas development. The remaining portion of the Uinta Mountains inventoried roadless area in the appeal settlement zone is available for lease with no surface occupancy. Current leases covering portions of this area (see Chapter 3, Topic 9 for details) are not included in this decision. Recreation related opportunities for economic benefits are tied to the ROS classes. Ski area boundary expansions are not allowed nor are new ski areas. In general, outputs are dependent on consistency with achieving goals for biodiversity, species viability and watershed health. *See Comparison of Alternatives Tables 2-2 and 2-7 for activities and outputs.*

Alternative 2 addresses the issue of **appropriate types and amounts of facility development** by allowing very limited additional facility development. Replacement of current facilities that have unacceptable impacts to resources is allowed and some additional facilities to accommodate recreation as mapped in ROS classes. Facilities must be consistent with goals for biodiversity, species viability and watershed health. Trail construction is allowed consistent with management prescriptions and to the degree that it does not conflict with other goals. Facilities at ski areas would be consistent with the Resort Natural Setting landscape character theme.

Management Prescriptions and Allowed Activities Alternative 2

Prescription Category 1: Wilderness, Alternative 2

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing[1]	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.5	No	No	Yes	No	Yes	Yes	No	No

[1]As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas, Alternative 2

Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	No	Yes	Yes	No	Yes	Yes	No	No
2.6	No	Yes	Yes	No	Yes	Yes	No	No
2.7	No	Yes	Yes	No	No	Yes	No	No

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	Yes	Yes	No	Yes	Yes	No	No
2.7	No	Yes	Yes	No	No	Yes	No	Yes[1]

[1]Associated with resource interpretation and public use

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity, Alternative 2

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1-3.2	No	Yes	Yes	No	Yes	Yes	No	No

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1]
3.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[2]

[1]Trail construction allowed if consistent with riparian management objectives
[2]Trail construction is allowed with consideration of existing trail densities

Prescription Category 4: Recreation Needs and Opportunities, Alternative 2

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	No	Yes	Yes	No	Yes	Yes	No	Yes
4.4	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	No	No	No	Yes	Yes

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities, Alternative 2

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	No	Yes	Yes	No	Yes	Yes	No	No

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 6: Rangeland Vegetation Needs and Opportunities, Alternative 2

Within Inventoried Roadless areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	No	Yes	Yes	No	Yes	Yes	No	No

Outside Inventoried Roadless areas:

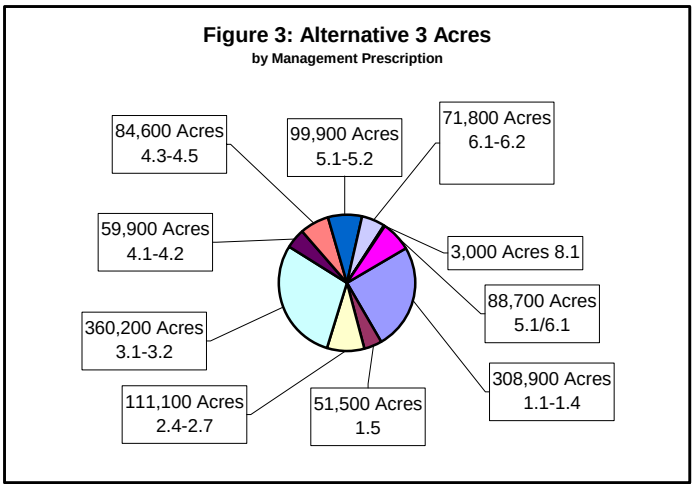
Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas, Alternative 2

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	Yes	Yes	Yes	Yes	Yes	No	No	No

Alternative 3

Background/Theme



Alternative 3 was originally developed as the "Proposed Action" for Forest Plan revision and was provided for public comment in September, 1999 and again as part of the five Preliminary Alternatives provided in September 2000. Public comment suggested that increased access for recreation did not necessarily belong only in Alternative 5 with increases in commodity uses even though those uses could inherently increase access through road building. We modified Alternative 3 from earlier versions to provide increased recreation access in response to increasing demands, especially for winter motorized use.

Alternative 3 provides a mix of uses and protection/restoration activities. It incorporates results of monitoring, project analyses and area assessments with some aspects of evolving policy such as the National Roadless Area Conservation Rule, although it does not apply this rule in its entirety. This alternative emphasizes adjusting management activities to ensure emphasis on ecosystem functioning and sustainability while providing some commodity outputs and a variety of recreation opportunities.

Response to Issues

Alternative 3 addresses the issue of **recreation use conflicts and access management** by increasing the amount of area open for snowmobiling over that currently available to reduce user densities and improve distribution of growing demand. Timing of allowed use and/or facility design and access would be used to reduce winter recreation conflicts. In some cases additional parking would be provided to increase snowmobile opportunities. Areas closed to winter motorized uses because of critical big game winter range total 136,700 acres or 11% of total Forest acres. Areas open to winter motorized uses are increased by about 28,800 acres over existing. Heli-skiing would be allowed, though in a different area than currently permitted to offset terrain recommended as wilderness. Summer motorized recreation is allowed on routes designated as open in current Travel Maps except for those within areas recommended as wilderness. In these areas, about one mile of currently open motorized trail would be closed to motorized uses. Some routes not currently open on Ogden Ranger District Travel Maps would be evaluated for potential motorized trail development. ROS categories are similar, but not identical to current conditions (see Table 2-4 in the last section of this Chapter). Management Prescription Categories 4.1, 2.6, 1.5, and 4.2 provide some guidance for upper limits on desired user densities. *See Comparison of Alternatives Tables 2-4, 2-5 for acres of different recreation opportunities.*

Alternative 3 addresses the issue of **roadless area management** by applying management prescriptions that maintain or mostly maintain 425,000 acres or 70 percent of inventoried roadless area as undeveloped recognizing that these values are important in the context of the already developed portions of the forest along with dominance of development on private lands. Areas recommended for Wilderness designation (about 51,300 acres or 8% of inventoried roadless areas) are shown in dark green on the maps in the map packets. These areas were selected based on highest wilderness characteristics and minimizing conflicts with other uses. Remaining inventoried roadless areas are open for development to the extent consistent with the mapped prescription. Most are assigned to prescriptions that focus on habitats (aquatic or terrestrial) and generally would not be developed or would only be developed where it would be *necessary* for achieving habitat improvement or restoration (see Allowed Activities by prescription below). *See Comparison of Alternatives Table 2-6 for disposition of inventoried roadless areas.*

Alternative 3 addresses the issue of **ensuring biodiversity and species viability (including watershed functions)** by emphasizing:

a. Managing at least portions of known wildlife corridors to maintain functions of corridors (regionally significant Bear River and currently designated western portion of East Fork Smiths Fork Uinta Mountains).
b. Managing livestock grazing through standards included in the 1996 Rangeland Health Record of Decision to achieve the desired conditions identified in that document and with emphasis on restoration of riparian areas.
c. Active vegetation management (prescribed fire, wildland fire use, suppression of fire for protection of life and property, timber harvest, thinning, mechanical treatment of fuels, and seeding with native species) to ensure landscapes function within the historic range of variability and mimicking of natural disturbance processes including insects and disease.
d. Maintenance of 70 percent of inventoried roadless areas as undeveloped.
e. Road decommissioning is pursued as consistent with current travel maps and evaluation of some routes for trails and priority is placed on improving water quality, fish habitat, and reduction of habitat fragmentation.
f. Encouraging control or eradication of non-native species.
g. Discouraging introductions of non-native species.
h. Developing conservation measures for groups of species based on rarity, habitat and/or risk factors, as well as those already identified as threatened, endangered, or sensitive.
i. Protecting and or restoring special habitats.
j. Maintenance of existing Research Natural Areas (Mollens Hollow, Morris Creek, and Red Butte) except for realignment of the lower portion of Red Butte to create a Special Interest Area.

Alternative 3 addresses the issue of concerns about **economic contributions and social benefits of the forest** through providing some, but not necessarily maximizing, outputs. It allows commodity production to the degree possible while moving vegetation and landscapes to properly functioning conditions. Timber harvest is allowed on suited lands consistent with mapped prescriptions. Forage for livestock is available within standards for maintaining or moving toward properly functioning conditions and consistent with special habitat needs. Focus

for restoration of rangelands in unsatisfactory condition is on riparian areas. Vacant allotments remain vacant or are used in conjunction with improvement of active allotments, but not eliminated from allotment status. However, given recent funding levels, stocking of vacant allotments is unlikely. The appeal settlement zone on the North Slope Uinta Mountains is available for oil and gas leasing. Lease stipulations aligned with management prescriptions and special habitat needs provide for surface occupancy on about 12,900 acres and no surface occupancy on about 37,200 acres. Areas recommended for wilderness (prescription 1.5) are not available for lease. Economic contributions of recreation related services (concessions, outfitter/guides) continue at levels similar to current. *See Comparison of Alternatives Tables 2-2 and 2-7 for activities and outputs.*

Alternative 3 addresses the issue of **appropriate types and amounts of facility development** by allowing additional recreation facilities construction consistent with mapped prescriptions and Recreation Opportunity Classes. The intent is to accommodate some of the growing demand with focus on areas mapped with recreation prescriptions. Trail construction is allowed consistent with management prescriptions. Ski area boundary expansion is not allowed, nor are new ski areas. Facilities at ski areas would be consistent with the Resort Natural Setting landscape character theme.

Management Prescriptions and Allowed Activities Alternative 3

Prescription Category 1: Wilderness Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.4	No	No	Yes	No	Yes[1]	Yes	No	No
1.5	No	No	Yes	No	Yes	Yes	No	Yes

[1]As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	Yes	Yes	No	Yes	Yes	No	No
2.7	No	Yes	Yes	No	No	Yes	No	Yes[1]

[1]Associated with resource interpretation and public use

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity Alternative 3

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1-3.2	No	Yes	Yes	No	Yes	Yes	No	No

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1-3.2	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1,2]

[1]Trail construction allowed if consistent with riparian management objectives
[2]Trail construction is allowed with consideration of existing trail densities

Prescription Category 4: Recreation Needs and Opportunities Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

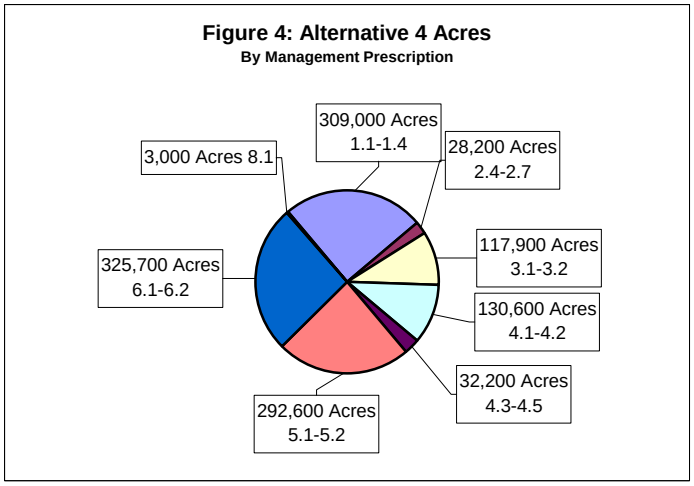
Prescription Category 6: Rangeland Vegetation Needs and Opportunities Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas Alternative 3

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Alternative 4



Background/Theme

Alternative 4 is formally the "No Action" alternative required by the National Environmental Policy Act. It can also be described as the "continuation of management under direction of the 1985 forest plan" alternative. It represents the 1985 plan as written and amended, however, to contrast the direction of the 1985 plan with needs for change identified since 1992, other sources of management direction that have been applied, but not incorporated into the 1985 forest plan, are *not* included. The 1992 5-Year Monitoring Report found *"serious weaknesses" which when taken in aggregate, resulted in a conclusion that a forest plan revision should be initiated.*

Response to Issues

Alternative 4 addresses the issue of **recreation use conflicts and access management** by continuing motorized and non-motorized opportunities in summer according to current Travel Management Plans. Heli-skiing continues in currently permitted terrain. Recreation Opportunity Classes as mapped in the 1985 Forest Plan are provided on a map in the map packets for reference and acres open to winter motorized uses are shown in Chapter 3, however this map was never viewed or used as an allocation and was not revised as changes occurred through site-specific decisions. Areas closed to winter motorized uses because of critical big game winter range totaled 88,300 acres or 7% of total Forest acres. This recreation opportunity mapping anticipated more than double the number of acres of Roaded Natural than exists today, consequently significantly reducing the acres of semi-primitive recreation opportunities. The 1985 Plan discourages separation of uses. User densities are generally controlled through available parking, facility availability, and some areas where designated dispersed policies have been applied through recent project decisions. Increasing demand is met through recreation facility and trail construction and reconstruction investments (USDA Forest Service 1985: 342-349) that are contingent on actual budget allocations. See Tables 2-4 and 2-5 for Alternative 4's relative acreage of each recreation opportunity class for non-snow seasons and winter (minimum snow depth of 1 inches).

A**lternative 4** assumes management direction to include:

a. All Forest Plan amendments (#1-35). Examples of amendments which affect large areas: Rangeland Health Amendment, Goshawk Amendment, Utah Fire Amendment
b. Current Travel Management Plans.
c. Conservation strategies NOT requiring plan amendment applied project by project.
d. Conclusions from 1992 5-Year Monitoring Report (Section V. pgs. 106-115) that have been incorporated into subsequent plan implementation: Resource Inventories,

Recreation Program Management, Riparian Management, Timber Objectives, Water Quality Monitoring, Biodiversity, Budget/Target Issues, and Monitoring Requirements.

e. 1985 Standards and Guidelines as amended.

Important note: The 1985 forest plan, although it did include "prescriptions", did not employ the Management Prescription Categories now required for forest planning. Therefore, the mapping of management prescriptions for this Alternative shown on maps accompanying this document required a number of assumptions about, and interpretations of, the 1985 plan. There was no way to translate that plan with a 1:1 correlation to today's prescription categories. The mapping of prescriptions for this Alternative therefore is only an estimation of the intent of that plan in prescription category terms. We have provided this mapping and relative acreages for purposes of comparison. Since that plan tended to be very general in some regards and presented management direction resource by resource without clear priorities or integration, the application of prescription categories was based on our best interpretation of that plan's wording translated to today's prescription categories.

It should also be noted that since 1992, when the need for plan revision was first identified, on-the-ground management has evolved to incorporate integration of the various resource management needs. This means that decisions on management of projects based on site-specific analyses have often resulted in actions that match prescriptions such as 5.1 or 6.1 rather than 5.2 or 6.2. However, since the Forest plan direction was not amended, prescription mapping to represent the 1985 plan is generally with prescriptions such as 5.2 or 6.2. These better match the wording in the 1985 plan.

Alternative 4 implements general direction from the 1985 plan emphasizing various outputs, but with project-by-project application of ecosystem approach and findings from the 1992 5-Year Monitoring Report. Except where project analyses have resulted in other combinations of multiple use emphasis based on integration of resource management needs, forested vegetation is managed for growth and yield on suited timberlands and suited rangelands are managed primarily for livestock forage. Outputs are dependent on investments (for example - USDA Forest Service 1985: pages IV – 355-373, Range Improvements- fences, water developments, noxious weed control, plowing, seeding, spraying, sagebrush burning, stock trail construction) and thus are contingent on actual budget allocations.

This alternative emphasizes improved facilities for recreation and accommodation of increased demands for recreation through additional facility construction, again contingent on budgets. Expansion of developed and dispersed summer and winter recreation is envisioned. Project decisions have addressed expansion of winter developed recreation for some ski-based resort areas. Other decisions about ski-based resort development are based on Master Development Plans completed or in progress.

Alternative 4 addresses the issue of **roadless area management** by recommending no additional areas for Wilderness designation to form a baseline with which to compare other alternatives that do make wilderness recommendations. Inventoried roadless areas are mapped with prescriptions that generally maximize flexibility, allowing development for commodity outputs and recreation access. About 131,900 acres or 22% of inventoried roadless areas are

mapped with prescriptions that maintain the undeveloped character because there are few other uses foregone. *See Comparison of Alternatives Table 2-6 for roadless area disposition.* **Alternative 4** addresses the issue of **ensuring biodiversity and species viability** project by project by emphasizing requirements of various conservation strategies as constraints on commodity production and in project design. The 1996 Rangeland Health Amendment established desired future conditions for rangeland ecosystems (riparian areas, uplands, aspen, and alpine areas) along with monitoring requirements. Projects such as prescribed burns and timber harvest are used to move vegetation communities toward or maintain them within the historic range of variability based on properly functioning condition assessments. Wildland fire use has been approved Forestwide. Noxious weeds are controlled contingent on budget available. Specific knowns (i.e. actual presence, nests, etc.) about species distribution and habitat needs guide management practices. Where there are unknowns, management flexibility for sustained commodity outputs is tempered by best available guidance provided on a project-by-project basis. Road density standards call for any new construction to be matched with equal road mile decommissioning. Habitat improvement (USDA Forest Service 1985: 350-354) focuses on big game winter range (burning, seeding, pruning), aspen restoration, snag and old growth marking, wildlife water development and aquatic structural improvements (lake aeration, in-stream structures), all investments contingent on actual budget allocations. Rangelands in unsatisfactory condition are addressed in Allotment Management Plan Revisions. Watershed improvement projects are listed (USDA Forest Service 1985: 377-382) with accomplishment contingent on budget allocations. More recent priorities for watershed restoration have been established through the Inland West Watershed Initiative and Clean Water Action Plan. Existing Research Natural Areas are maintained (Mollens Hollow, Morris Creek, Red Butte).

Alternative 4 addresses the issue of concerns about **economic contributions and social benefits of the Forest** through emphasis on predictable sustained commodity outputs constrained by conservation strategies, Forestwide Standards and Guidelines, and project specific mitigation. Forested lands are managed for timber production (with direction for priority on those lands susceptible to mountain pine beetle epidemics). Exceptions to these are areas removed because of high water table, regeneration difficulties, and where project-level environmental analyses have established additional objectives. Economic contributions from timber harvest have proved to be substantially less than the 1985 plan projected. Reevaluation in 1992 found timber volume objectives were inaccurate because of problems with volume conversions, timber availability assumptions, and technical concerns with implementation. Methods of timber harvest have more recently integrated ecosystem management principles through project-by-project analysis.

Except where Allotment Management Plan revisions have established adjusted combinations of multiple use emphasis based on integration of resource management needs, forage for livestock grazing is the emphasis on rangelands. Investment in numerous range structural improvements was anticipated in the 1985 Plan, however implementation contingent on budget allocations has been significantly less affecting output capabilities. Vacant allotments are dealt with on a case-by-case basis. However, given recent funding levels, stocking of vacant allotments is unlikely. Oil and gas leasing specifics were decided in 1994 for all but the appeal settlement zone, which is about 68,300 acres of inventoried roadless area on the North Slope of the Uinta Mountains. That area remains unavailable pending additional analysis. Existing leases (on about 19,000

acres) in this area (see oil and gas topic in Chapter 3) would continue as they exist now until they expire. Recreation related economic benefits are a function of roaded natural ROS, which maintains some roads associated with timber harvest as motorized and nonmotorized access to the Forest. Ski area boundary expansion is not allowed as recent Master Development Plans have resulted in decisions not to allow boundary expansions on National Forest System Lands. No new ski areas are allowed. *See Comparison of Alternatives Tables 2-2 and 2-7 for activities and outputs.*

Alternative 4 addresses the issue of **appropriate types and amounts of facility development** by listing all facilities along with projected development standards as well as identifying areas intended for additional development. However, available budgets did not match those projections and subsequent development has been less than anticipated. Reevaluation in 1992 found that the developed recreation site program needed to emphasize maintenance of existing facilities and correction of resource problems prior to construction of new facilities. New facility construction, including trail construction, in this Alternative would continue to be addressed in project-by-project analyses, contingent on budget allocations. Facilities in Ski Areas are consistent with decisions made in Master Development Plans.

Management Prescriptions and Allowed Activities Alternative 4

Prescription Category 1: Wilderness Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing[1]	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.4	No	No	No	No	Yes	Yes	No	No

[1] As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	Yes
2.5	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	Yes	Yes	No	Yes	Yes	No	Yes
2.7	No	Yes	Yes	No	No	Yes	No	Yes

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

								Yes

Prescription Category 4. Recreation Needs and Opportunities Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.2	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

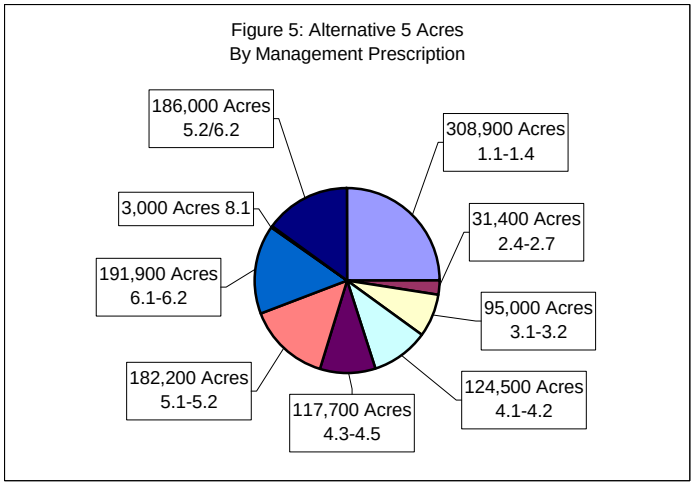
Prescription Category 6: Rangeland Vegetation Needs and Opportunities Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas Alternative 4

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Alternative 5



Background/Theme

Alternative 5 addresses the concern that the Forest can and should be used to directly benefit economies, livelihoods, and utilitarian traditions of families and local communities through predictable sustained outputs while allowing a variety of other non-exclusive uses and minimizing restrictions or requirements that drive up operating costs. While this alternative was developed to respond to concerns that often might be associated with rural communities, constituents who reviewed the Preliminary Alternatives package pointed out that many rural communities adjacent to the Wasatch-Cache National Forest have a wide diversity of views and values regarding appropriate forest management. This alternative does respond to the desires of people (rural, urban, or otherwise) who would like to see continuation of many historic and/or traditional uses of the forest and its resources, sometimes even for new purposes, but with restrictions only as necessary to meet legal requirements. This alternative strives to accommodate a variety of uses within the same areas to avoid need for separation or restriction.

Response to Issues

Alternative 5 addresses the issue of **recreation use conflicts and access management** by increasing motorized access over current and identifying potential areas and/or times for motorized and non-motorized winter uses to reduce conflicts. Additional areas (including some big game winter ranges) are opened to snowmobile access to reduce user densities and improve distribution of growing demand. Areas closed to winter motorized uses because of critical big game winter range total 129,500 acres or 10% of total Forest acres**.** Heli-skiing continues in currently permitted terrain. The roaded natural and semiprimitive motorized Recreation Opportunity Classes are the most common, expanding access, additional facilities, and dispersal of current uses to accommodate growing recreation demand. This alternative reduces some of the existing semi-primitive non-motorized recreation opportunities. *See Comparison of Alternatives Tables 2-4 and 2-5 for acres of different recreation opportunities.*

Alternative 5 assumes active management for sustained yields can be used to improve productivity and health of the forest. Access plays a major role in the ability to use the land. Timber management to prevent insect, disease, and wildfire outbreaks is envisioned in this alternative. Livestock grazing tied to year-round local ranching operations is supported on forest by vegetation management to increase forage production. Grazing is also viewed as a tool to reduce fine fuels and competition with regeneration of young trees. This Alternative takes a restrained approach to sustaining species and their habitat. By restrained we mean striving to prevent listing, but minimizing rather than assuming as necessary, restrictions on resource uses given the many unknowns about rare species. Forage for livestock, timber for harvest, oil and

gas leasing, and recreation related services and opportunities are emphasized while actively managing all of these uses together to reduce or avoid conflicts and achieve improved productivity of the land and resources.

Recreation opportunities in this alternative are increased over existing in the rural and roaded natural classes as a result of development of inventoried roadless areas for timber harvest and oil and gas exploration and development. Recreation is expected to be coordinated with other uses in the same areas in such a way that conflicts are minimized or avoided. More total recreation capacity is available because of increased numbers of facilities, allowance for higher user densities, and increased access.

Alternative 5 addresses the issue of **roadless area management** by recommending no additional areas for Wilderness designation consistent with the view that the existing 309,000 acres of Wilderness areas meet needs for wilderness and are an appropriate relative proportion of the forest. About 117,100 acres or 19 percent of inventoried roadless areas where few other uses would be foregone are managed to protect roadless area values. Remaining inventoried roadless areas are managed to provide access for timber and grazing management, oil and gas exploration and development, and recreation with project-by-project attention to critical habitats for wildlife, fish, and plant population viability. *See Comparison of Alternatives Table 2-6 for disposition of inventoried roadless areas.*

Alternative 5 addresses the issue of **ensuring biodiversity and species viability** by emphasizing prevention of listings with minimum requirements of various conservation strategies. Highest priority areas are protected through project-by-project mitigation measures. Specific knowns (presence, nests, etc.) about species distribution and habitat needs guide management practices. Where there are unknowns, management flexibility for sustained commodity outputs is given priority. Already designated Wilderness areas are provided for connectivity and low influence from human activities for wildlife habitat. Prescribed fire and wildland fire use in forested landscapes are allowed in areas with very low or no commercial timber value. Vegetation treatments are focused on forage production while being sensitive to protection of soils and vegetation. Areas in unsatisfactory condition are managed for restoration to forage production through proper grazing and recreation management. Special habitats are managed through mitigation of activities and regular monitoring to insure that populations are not significantly declining. Existing Research Natural Areas are maintained (Mollens Hollow, Morris Creek, Red Butte). The lower boundary of Red Butte Research Natural Area is adjusted to create a Special Interest Area.

Alternative 5 addresses the issue of concerns about **economic contributions and social benefits of the Forest** through emphasis on predictable sustained commodity outputs constrained project-by-project with application of conservation measures and mitigation requirements of law (endangered species, clean water and air, soil productivity, cultural resources protection). An aggressive management program for forested lands emphasizes sustained yield, and health of the forest (prevention of insects and disease, reduction of fuels, thinning of dense, slowly growing stands and increasing diversity of age structure). In cases where project environmental analyses or monitoring identify direct conflicts with plant or animal population viability, mitigation of livestock grazing is applied. In rangeland areas, prescribed

fire and wildland fire use are allowed to reduce brush canopy cover for increasing forage production although treatments are timed to minimize impacts to on-going grazing operations. Vacant allotments are available for use based on completion of required environmental analysis. Given recent funding levels this analysis would not be completed any time soon. The Burro, Thompson Peak, and West Beaver Allotments in the Uinta Mountains would remain vacant because of conflicts with bighorn sheep. Lands in the appeal settlement zone are available for oil and gas leasing under standard lease terms. Commodity outputs include recreation related services that produce economic benefits for local communities. Ski area boundary expansion would be allowed at Nordic Valley, The Canyons, Solitude and Snowbird. This alternative allows new ski areas. Recreation Opportunity Spectrum mapping meshes with access for timber and forage production as well as oil and gas exploration and development. Commodity outputs for this Alternative are expected to be the highest of the six Alternatives. *See Comparison of alternatives Tables 2-2 and 2-7 for activities and outputs.*

Alternative 5 addresses the issue of **appropriate types and amounts of facility development** by accommodating current and future demands for recreation opportunities with development of appropriate facilities to expand multi-seasonal uses. More areas (primarily adjacent to current ski areas) are identified as Resort Natural Setting landscape character theme for scenery management. Ski area expansion is allowed as well as additional parking in various high demand areas throughout the Forest. Facilities are developed and new trails constructed to disperse and/or mitigate concentration of recreation in areas, especially those along streams and lakes. However, resources available for this development are expected to be a limiting factor considering recent funding levels.

Management Prescriptions and Allowed Activities Alternative 5

Prescription Category 1: Wilderness, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing[1]	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.4	No	No	No	No	Yes	Yes	No	No

[1] As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	Yes	Yes	No	Yes	Yes	No	No[1]
2.7	No	Yes	Yes	No	No	Ye	No	Yes[2]

[1] Trail reconstruction and realignment are allowed to correct resource problems

[2]Associated with resource interpretation and public use

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1]
3.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[2]

[1]Trail construction allowed if consistent with riparian management objectives

[2]Trail construction is allowed with consideration of existing trail densities

Prescription Category 4: Recreation Needs and Opportunities, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.2	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Prescription Category 6: Rangeland Vegetation Needs and Opportunities, Alternative 5

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas, Alternative 5

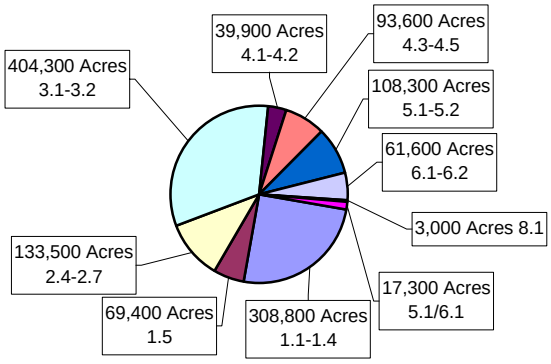
Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Alternative 6

Background/Theme

This Alternative was developed after comments on the five "Preliminary Alternatives" had been compiled. The purpose was to round out the range of alternatives and provide some combinations of management prescriptions and emphasis in specific areas that were not represented by the other alternatives.

Figure 6: Alternative 6 Acres by Management Prescription



Alternative 6 addresses concerns about **needs for emphasis on biodiversity**, by mimicking natural processes in some areas with active human management while restoring natural processes to other areas with minimal human intrusion. Conservation of large roadless areas, highlighting of substantial areas for emphasis on sustaining important terrestrial and aquatic habitats, and concentrating activities in areas where they can be managed sustainably provides the basis for this alternative. Uses are allowed and mitigated to maintain ecosystem functions in some areas while in other areas uses are restricted to achieve restoration or protection of properly functioning ecosystem conditions. In inventoried roadless areas, no road construction or reconstruction is allowed and timber harvest is strictly limited consistent with the National Roadless Rule. Expected commodity outputs are lower than recent years with some areas providing a limited, but continual supply and others removed or reduced from commodity production to sustain other important wildland values (such as watershed functioning, ecological reserves and biodiversity corridors, opportunities for solitude, and special designation of reference benchmarks for learning – Research Natural Area/Special Interest Area).

Recreation opportunities are managed intensively in some areas to meet increasing demands, especially in the wildland/urban interface. Areas further from major population bases are managed for a wider variety of recreation opportunities including substantial areas of primitive and semiprimitive classes. Winter recreation uses are separated in key areas to provide both motorized and non-motorized opportunities with access and parking. Total area available for snowmobiling is less than current but high and moderate use areas are maintained as open. Summer motorized recreation is allowed on routes designated as open in current Travel Maps.

Response to Issues

Alternative 6 addresses the issue of **recreation use conflicts and access management** by allowing winter motorized use except where there are specific reasons not to allow it. These include portions of big game winter ranges, specific areas for cross-country skiing, areas recommended for wilderness, and some areas where a motorized boundary is difficult to manage. Conflicts between winter motorized and non-motorized uses are resolved through identification of desirable snowmobiling and cross-country skiing areas, analysis of overlaps and determination of areas to separate these uses. Areas closed to winter motorized uses because of critical big

game winter range total 166,700 acres or 13% of total Forest acres. Heli-skiing continues in currently permitted terrain. Summer motorized recreation is allowed on routes designated as open in current Travel Maps. Areas recommended as wilderness do not contain any currently open motorized roads or trails. Some routes not currently open on 1988 travel maps for Ogden Ranger District would be evaluated for potential motorized trail development. Primitive and semiprimitive recreation opportunity classes (both motorized and nonmotorized) are managed (potential permit system) to maintain low user densities. Other opportunity classes are managed to allow for increases in demand by more intensive measures such as site hardening and designation of dispersed campsites. *See Comparison of Alternatives Tables 2-4 and 2-5 for acres of various recreation opportunities.*

Alternative 6 addresses the issue of **roadless area management** by adjusting allowed activities for prescriptions in inventoried roadless areas to be consistent with the National Roadless Area Conservation Rule. Road construction and reconstruction are not allowed in these areas, nor is cutting, sale, and removal of timber except: for the cutting, sale or removal of generally small diameter trees which maintains or improves roadless characteristics *and* 1) to improve habitat for threatened, endangered, proposed, or sensitive species, or 2) to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. About 70,000 acres or 12 percent of inventoried roadless areas are recommended for Wilderness designation. Areas selected have the highest quality wilderness characteristics and relatively easily managed boundaries, but minimize conflicts with existing uses and other uses foregone. Inventoried roadless areas not recommended for wilderness apply prescriptions that protect roadless character. *See Comparison of Alternatives Table 2-6 for disposition of inventoried roadless areas and FEIS Appendix C1 and C2 for details about individual inventoried roadless areas.*

Alternative 6 addresses the issue of **ensuring biodiversity and species viability (including watershed functions)** by emphasizing factors known to contribute to conservation biology with a combined approach of active human intervention in some areas and minimal intervention in others by taking actions as follows:

a. Identifying current or managing to create a system of areas representing all native ecological units and seral stages across their historic range of variation.
b. All known wildlife corridors managed to maintain function of corridor (regionally significant Bear River and currently designated western portion of East Fork Smiths Fork Uinta Mountains).
c. Manage and/or restore rangelands and manage livestock grazing (through Allotment Management Planning) to restore proper functioning of watersheds, riparian areas, and lands in unsatisfactory condition. Three vacant sheep allotments in the Uinta Mountains (Burro, Thompson, and West Beaver) are closed for bighorn sheep habitat. Other vacant allotments are evaluated on a case-by-case basis for use in conjunction with existing active allotments to restore desired conditions or for removal from allotment status. However, given recent funding levels, stocking of vacant allotments is unlikely.
d. Active vegetation management practices such as suppression of fire for protection of life and property, timber harvest, thinning, mechanical treatment of fuels, and/or seeding with native species is applied primarily to lands already roaded or developed, mimicking natural disturbance processes including insects and disease where possible; while

practices including prescribed fire, and wildland fire use are emphasized in undeveloped lands to move landscapes within the historic range of variability to the degree that is compatible with other objectives.

e. Maintain inventoried roadless areas as undeveloped.
f. Road decommissioning is pursued as consistent with Travel Maps (upon evaluation for potential motorized trails for 1988 Travel Maps) and priority placed on improving water quality, fish habitat, and watershed functions and reduction of habitat fragmentation.
g. Take aggressive actions to greatly reduce noxious weeds.
h. Maintain or restore connectivity of forested lands.
i. Discourage introductions of non-native species, especially in wilderness.
j. Monitor and assess for viability groups of species identified as management indicator species and/or focal species (categories of species used to assess ecological integrity).
k. Protect and/or restore special habitats (3 grazing allotments in the Uinta Mountains would be phased out from allotment status if permits are voluntarily waived without preference, to provide for bighorn sheep habitat).
l. Encourage restoration of native cutthroat trout to key drainages (Hayden Fork, Whitney, Temple Fork, Beaver Creek, Causey, South Fork Weber).
m. Maintenance of existing Research Natural Areas (Mollens Hollow, Morris Creek, and Red Butte) except for realignment of the lower portion of Red Butte to create a Special Interest Area; include additional acreage with current Morris Creek RNA.
n. Designate special interest areas in Willard Basin, and lower Logan Canyon for botanical values, and the T.W. Daniels Experimental Forest for educational purposes.

Alternative 6 addresses the issue of concerns about **economic contributions and social benefits of the Forest** through using opportunities for economic benefit from active vegetation management areas, while mitigating for maintenance of biodiversity, species viability, and watershed health. Values for water quality, air quality, natural ecological functions, and perpetuation of species, as well as administrative and environmental costs of commodity outputs are recognized and included.

Some forested lands are identified as suitable and mapped with prescription 5.2 for emphasis on timber production. Other tentatively suited lands are available for timber harvest where that activity can be mitigated to meet habitat objectives and/or to mimic natural disturbance processes. Livestock grazing is managed on suitable rangelands to meet standards associated with habitat and watershed needs. Allotments with substantial areas in unsatisfactory condition will be highest priority for Allotment Management Plan revision. Where movement of livestock or other structural means does not accomplish satisfactory conditions (based on monitoring), or are not economically feasible, livestock grazing will be removed. Vacant allotments are evaluated on a case-by-case basis for either use in conjunction with improving conditions on other active allotments or for removal from allotment status. However, given recent funding levels, stocking of vacant allotments is unlikely. Lands in the appeal settlement zone recommended as wilderness in the Uinta Mountains are not available to lease for oil and gas development. The remaining lands in the appeal settlement zone are available for leasing primarily with no surface occupancy. About 3,600 acres are available with surface occupancy. Recreation related opportunities for economic benefits are tied to the ROS classes. Ski area boundary expansions are not allowed nor are new ski areas. In general, outputs are somewhat

less than in recent years and are dependent on ability to mitigate for biodiversity, species viability and watershed health. *See Comparison of Alternatives Tables 2-2 and 2-7 for activities and outputs.*

Alternative 6 addresses the issue of **appropriate types and amounts of facility development** by allowing some additional facility development primarily in roaded natural, rural and urban ros classes. Replacement of current facilities that have unacceptable impacts to resources is emphasized along with site designation and access hardening in heavily used or potentially heavily used dispersed recreation areas to prevent impacts. Facility design and construction must include mitigation for maintenance of biodiversity, species viability and watershed health. Trail construction is allowed consistent with management prescriptions to provide a variety of opportunities, particularly in already developed areas. Facilities at ski areas would be consistent with Resort Natural Setting landscape character theme.

Management Prescriptions and Allowed Activities Alternative 6

Prescription Category 1: Wilderness, Alternative 6

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire[1]	Road Building	Grazing[2]	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.5	No	No	Yes	No	Yes	Yes	No	No

[1] As allowed to meet wilderness objectives

[2] As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas, Alternative 6

Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	No	Yes	Yes	No	Yes	Yes	No	No
2.6	No	Yes	Yes	No	Yes	Yes	No	No
2.7	No	Yes	Yes	No	Yes	Yes	No	No

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No[1]
2.5	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	Yes	Yes	No	Yes	Yes	No	No[1]

2.7	No	Yes	Yes	No	No	Yes	No	Yes[2]

[1]Trail reconstruction and realignment are allowed to correct resource problems
[2]Associated with resource interpretation and public use

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity Alternative 6

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1	No	Yes	Yes	No	Yes	Yes	No	Yes[1]
3.2	No	Yes	Yes	No	Yes	Yes	No	Yes[2]

[1]Trail construction allowed if consistent with riparian management objectives
[2]Trail construction is allowed with consideration of existing trail densities

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1]
3.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[2]

[1]Trail construction allowed if consistent with riparian management objectives
[2]Trail construction is allowed with consideration of existing trail densities

Prescription Category 4: Recreation Needs and Opportunities, Alternative 6

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	No	Yes	Yes	No	Yes	Yes	No	Yes
4.4	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	No	No	No	Yes	Yes

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes

4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	No	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities, Alternative 6

Within Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	No	Yes	Yes	No	Yes	Yes	No	Yes

Outside Inventoried Roadless Areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 6: Rangeland Vegetation Needs and Opportunities Alternative 6

Within Inventoried Roadless areas:

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	No	Yes	Yes	No	Yes	Yes	No	Yes

Outside Inventoried Roadless areas:

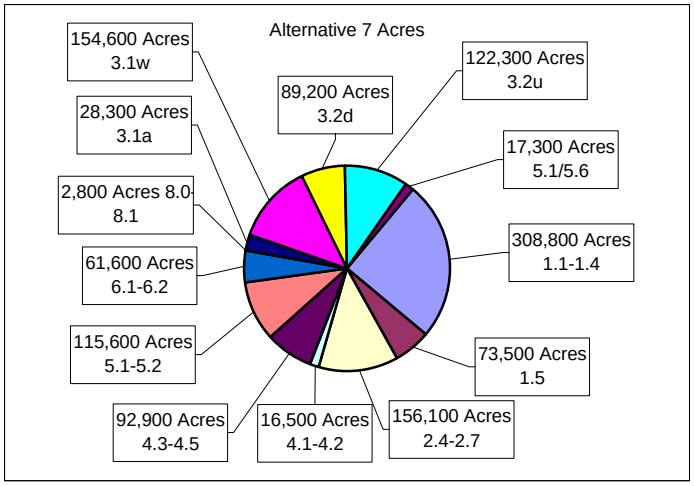
Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas Alternative 6

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.

8.1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Alternative 7



Background/Theme

This Alternative was developed after public comments on the six alternatives described in the draft environmental impact statement had been reviewed, categorized, and analyzed. The purpose was to improve resolution of issues raised in public comments and to adapt the final preferred/decision alternative to current policy. Some components of the DEIS Preferred Alternative 6, were retained while other components were adjusted in response to comments and in response to recent policy regarding roads analysis and roadless area management.

Key changes made to the DEIS preferred alternative to develop this alternative include:

- Evaluation of individual roadless area values (FEIS Appendix C2) and identification of roadless areas or portions of roadless areas to be 1) recommended as wilderness, 2) maintained as roadless or undeveloped, or 3) where timber harvest, road construction or other development would be allowed.
- Clarification of intent with regard to allowed activities for management prescription categories 3.1 and 3.2 by 1) Dividing 3.1 into two subcategories- 3.1A specifically for riparian/aquatic emphasis and 3.1W specifically for upland watershed emphasis; and 2) Dividing 3.2 into two subcategories- 3.2U for terrestrial wildlife habitat not allowing development (primarily roading and timber harvest) and 3.2D for terrestrial wildlife habitat allowing this type of development (See also Tables of Allowed Activities for Alternative 7, and Revised Forest Plan Chapter 4A.5, Management Prescriptions).
- Clarification of intent in all prescriptions for allowing new trail construction (See Tables of Allowed Activities).
- Identification of fuel treatment needs in wildland urban interface areas and mapping of management prescriptions that allow mechanical fuel treatment on these areas (Prescription 2.6 does *not* allow this).
- An additional Guideline for lower allowed forage utilization on rangelands in unsatisfactory condition in response to concerns about rangeland conditions.
- Identification of additional areas of the North Slope Uinta Mountains where bighorn sheep habitat could be emphasized in the future should livestock grazing permits be voluntarily waived without preference.
- Adjustment of outputs and activities projections with improved information.
- Changes in prescription mapping, recreation opportunity class mapping, and winter recreation mapping for specific areas in response to public concerns.

Alternative 7 addresses concerns about needs for emphasis on biodiversity by attempting to balance human impacts and uses with maintenance of overall ecological integrity. This

Alternative proposes actively managing (primarily vegetation treatments) some areas of the forest to restore ecological functioning and reduce hazardous fuels, allowing continued production of commodity resources for human use in many areas, and in other areas, allowing natural processes to proceed with less human intrusion. This management approach emphasizes conservation of *most* (75% of total) roadless areas and their values by maintaining them as undeveloped (with application of management prescriptions 1.5, 2.4, 2.6, 2.7, 3.1A, 3.1W, 3.2U, 4.1, 4.2- see Maps). It highlights substantial areas for emphasis on sustaining important terrestrial and aquatic habitats through active management with uses restricted, to achieve restoration or protection of properly functioning ecosystem conditions (prescriptions 3.1A, 3.2U and D- see Maps). This Alternative concentrates human uses and commodity production activities in areas where they can be managed sustainably, i.e. mitigated to maintain primary ecosystem functions (prescriptions 2.5, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1- see Maps). Expected total commodity outputs are slightly lower than in recent years with some areas providing a limited, but continual supply and others removed or reduced from commodity production to sustain other important wildland values (such as watershed functioning, ecological reserves and biodiversity corridors, opportunities for solitude, and special designation of reference benchmarks for learning such as RNA/SIA).

Recreation opportunities are managed intensively in selected areas to meet increasing demands, while recognizing the importance of watersheds especially in the vicinity of current and future urbanization. Areas further from major population bases are managed for a wider variety of recreation opportunities including substantial areas of primitive and semiprimitive classes. The popularity of recreation (especially camping) outside developed sites is recognized and specific actions to provide for this use while protecting watersheds and vegetation are proposed. Winter recreation uses are separated in several areas to provide both motorized and non-motorized opportunities with access and parking. Recognizing the distances that can be covered and growing demand, total area open for snowmobiling is 540,700 acres or 44% of total Forest acres (25% of which are Congressionally designated Wilderness). Areas closed to snowmobiling specifically for providing quality non-motorized winter opportunities total 7,500 acres or .8% of total Forest acres. Areas closed to winter motorized uses because of critical big game winter range total 190,700 acres or 15% of total Forest acres. Summer motorized recreation is allowed on routes designated as open in current Travel Maps and several areas for potential future expansion of designated motorized routes are identified.

Response to Issues

Alternative 7 addresses the issue of **recreation use conflicts and access management** <u>in winter</u> by providing for winter motorized use consistent with growing demand and the nature of the activity (i.e. large distances can be covered), while identifying selected areas for separation of non-motorized winter opportunities. Portions of big game winter ranges, specific areas for cross-country skiing, some areas recommended for wilderness, and some areas where a boundary is impractical to manage are identified and mapped as non-motorized. Designated routes are indentified through some big game winter ranges to allow snowmobile access to desirable higher elevation areas. Snowmobiling use where it exists now (Lakes and portions of High Uintas roadless areas) within areas recommended for wilderness continues to be allowed as interim

management until such time that Congress acts on wilderness designation. Heli-skiing continues to be allowed in currently permitted terrain.

Opportunities for summer motorized recreation are provided on routes designated as open in current Travel Maps. Some areas with potential routes not currently open on travel maps for Ogden and Logan Ranger Districts are identified for potential future motorized trail development (See Revised Forest Plan, Chapter 4.B. Management Area Direction- Desired Future Conditions). Also the Shoshone Trail System is emphasized connecting existing motorized routes on National Forest, Bureau of Land Management, and State lands to provide extended riding opportunities between communities while providing an alternative to the unauthorized trails in sensitive watersheds along the Wasatch Front. Primitive and semiprimitive recreation opportunity classes have identified ranges of user densities to allow for monitoring of use patterns. Upon approaching thresholds, this Alternative proposes public notification and evaluation of whether to initiate management actions (potential permit system or other actions) to maintain, limit, or allow for increases in user densities and amend the ROS Class. Other opportunity classes are managed to allow for increases in demand by more intensive measures such as site hardening and designation of dispersed campsites. *See Comparison of Alternatives Tables 2-4 and 2-5 for acres of various recreation opportunities.*

Special emphasis on education and enforcement is proposed through an objective in the Revised Forest Plan in response to public comments. Off Highway Vehicle use, watershed health, and user ethics are identified as key focus areas for education and enforcement.

Alternative 7 addresses the issue of **roadless area management** by applying evaluation of individual roadless area values (FEIS Appendix C2) and resource capabilities/conditions to mapping of management prescriptions that either maintain or mostly maintain undeveloped character (75% of roadless acres) or allow varying types and degrees of development for specific purposes consistent with the prescription emphasis (25% of roadless acres). Road construction and reconstruction are not allowed in most roadless areas, nor is cutting, sale, and removal of timber. In most of these areas, prescribed and wildland fire use will be the primary approach to returning vegetation to properly functioning conditions. Timber harvest and road construction are allowed in portions of some roadless areas for purposes of improving habitat for terrestrial wildlife (prescription 3.2D) and to maintain or restore ecosystem composition and structure and/or reduce the risk of uncharacteristic wildfire effects (prescription 5.1), and for purposes of timber production (prescription 5.2). About 73,300 acres or 12% of inventoried roadless areas are recommended for Wilderness designation because of their high quality wilderness characteristics and minimal conflicts with other uses. In this Alternative, unlike the others, the recommended wilderness prescription (1.5) allows prescribed fire and continuation of existing snowmobiling. See Comparison of Alternatives Table 2-6 for summary disposition of inventoried roadless areas and FEIS Appendices C1 and C2 for details about individual inventoried roadless areas.

Alternative 7 addresses the issue of **biodiversity and species viability (including watershed functions)** by emphasizing factors known to contribute to conservation biology with a combined approach of active human intervention in some areas and minimal intervention in others by taking actions as follows:

a. Identifying current, or managing to create, a system of areas representing all native ecological units and seral stages across their historic range of variation.
b. All known wildlife corridors managed to maintain function of corridor (regionally significant Bear River and currently designated western portion of East Fork Smiths Fork Uinta Mountains).
c. Manage and/or restore rangelands and manage livestock grazing (through the new Guideline for lower allowed forage utilization (30-40% rather than 50%) on lands in unsatisfactory condition, improved emphasis on permit administration, refined annual operating instructions, and Allotment Management Plan revisions) to restore proper functioning of watersheds, riparian areas, and lands in unsatisfactory condition. Closes vacant allotments (Clegg, Hardscrabble, Mill Canyon, Shingle Mill, and Wright) in the Salt Lake County and Davis County watersheds. Three vacant sheep allotments in the Uinta Mountains (Burro, Thompson, and West Beaver) are closed for bighorn sheep habitat. Other vacant allotments are left open pending future site-specific analysis. However, given recent funding levels, stocking of vacant allotments is unlikely.
d. Active vegetation management practices such as suppression of fire for protection of life and property, timber harvest, thinning, mechanical treatment of fuels, and/or seeding with native species are applied to already developed areas and about 25 percent of inventoried roadless area acres, mimicking natural disturbance processes including insects and disease where possible; while practices including prescribed fire, and wildland fire use are emphasized in most (75%) undeveloped lands to move landscapes within the historic range of variability to the degree that this is compatible with other objectives.
e. Maintain most (71%) high value inventoried roadless areas as undeveloped.
f. Road decommissioning is pursued consistent with Travel Maps and priority based on roads analysis is placed on improving water quality, fish habitat, and watershed functions and reduction of habitat fragmentation.
g. Take aggressive actions to greatly reduce noxious weeds.
h. Maintain or restore connectivity of forested lands.
i. Discourage introductions of non-native species, especially in wilderness.
j. Monitor management indicator species and their habitats to validate assumptions about habitat relationships.
k. Protect and/or restore special habitats (7 grazing allotments in the Uinta Mountains would be closed if permits are voluntarily waived without preference, to provide for bighorn sheep habitat; establish baselines of compacted snow within lynx analysis units in the Uinta Mountians).
k. Add portions of the Burro Peaks, Thompson Peak and West Beaver Allotments to the adjacent, lower allotments, but maintains existing AUMs on those allotments.
m. Encourage restoration of native cutthroat trout to key drainages (Hayden Fork, Whitney, Temple Fork, Beaver Creek, Causey, South Fork Weber).
n. Maintenance of existing Research Natural Areas (Mollens Hollow, Morris Creek, and Red Butte) except for realignment of the lower portion of Red Butte to create a Special Interest Area allowing restoration research; include additional acreage with current Morris Creek RNA.
o. Designate special interest areas in Willard Basin, and lower Logan Canyon for botanical values, and the T.W. Daniels Experimental Forest for scientific and educational purposes.

Alternative 7 addresses the issue of concerns about **economic contributions and social benefits of the Forest** through using opportunities for economic benefit from active vegetation management on lands capable and tentatively suitable (primarily areas mapped as 5.2 and 5.1), while mitigating for maintenance of biodiversity, species viability, and watershed health. Recreation opportunities are emphasized for their value both to local economies and to quality of life for both urban and rural communities. Values for water quality, air quality, natural ecological functions, and perpetuation of species, as well as administrative and environmental costs of commodity outputs are recognized and included for maximizing net public benefit.

Some forested lands are identified as suitable and mapped with prescription 5.2 for emphasis on timber production. Other tentatively suited lands are available for timber harvest including salvage where that activity can be mitigated to meet habitat objectives and/or to mimic natural disturbance processes. Timber harvest is also allowed where it can be used to reduce hazardous fuels, improve aquatic or terrestrial habitat, long-term scenic or recreation site values, and/or for watershed improvement. Livestock grazing is managed on suitable rangelands to meet standards and guidelines associated with habitat and watershed needs. A lower forage utilization allowance (30-40% instead of 50%) is applied to lands in unsatisfactory condition. Allotments with substantial areas in unsatisfactory condition are highest priority for improved grazing administration. Where movement of livestock or other structural means does not accomplish satisfactory conditions (based on monitoring of key areas), or are not economically feasible, livestock grazing will be removed through grazing permit action until satisfactory conditions are achieved. Eight vacant allotments are closed and the others are left vacant pending site-specific analysis. However, given experienced budget levels and priority of other, active allotments it is expected that most vacant allotments will remain vacant during the planning period. Within the Appeal Settlement Zone of the Uinta Mountains 47,900 acres are available for oil and gas leasing. Of those, 27,000 acres allow surface occupancy. The remaining 20,400 acres in this Zone are unavailable. Recreation related opportunities for economic benefits are tied to the ROS classes. Ski area boundary expansions are not allowed nor are new ski areas. In general, outputs are expected to be slightly less than recent years and are dependent on the degree to which projects for improvement of terrestrial or aquatic habitat yield commercially viable opportunities. See Comparison of Alternatives Tables 2-2 and 2-7 for activities and outputs.

Alternative 7 addresses the issue of **appropriate types and amounts of facility development** by allowing some additional facility development primarily in roaded natural, and rural ROS classes. Replacement of current facilities that have unacceptable impacts to resources is emphasized along with site designation and access hardening in concentrated recreation use areas to prevent and/or mitigate impacts. Facility design and construction must include mitigation for maintenance of biodiversity, species viability and watershed health. Trail construction is allowed consistent with management prescriptions to provide a variety of opportunities, particularly in already developed areas. Emphasis is identified for completion of the Bonneville Shoreline and Great Western Trails and to connect the existing trail opportunities on National Forest (Ogden and Logan Ranger Districts) with trails on Bureau of Land Management, State and private lands similar to the concept of the Shoshone Trail System. Facilities at ski areas are consistent with Resort Natural Setting landscape character theme. The only change from existing conditions for recreation opportunity classes is within ski area permit boundaries where

the designation changes from roaded natural to rural to focus growing recreation use where facilities are available.

Management Prescriptions and Allowed Activities Alternative 7

Prescription Category 1: Wilderness, Recommended Wilderness, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
1.1-1.4	No	No	Yes[1]	No	Yes[2]	Yes	No	No
1.5	No	No	Yes	No	Yes	Yes	No	No

[1]As allowed to meet Wilderness Objectives (FSM 2324.21)
[2]As allowed under the 1984 Utah Wilderness Act

Prescription Category 2: Special Management Areas, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
2.4	No	Yes	Yes	No	No	Yes	No	No
2.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2.6	No	No	Yes	No	Yes	Yes	No	No
2.7	No	Yes	Yes	No	Yes[2]	Yes	No	Yes[1]

[1] Associated with resource interpretation and public use
[2] Within existing Allotments

Prescription Category 3: Aquatic/Watershed or Terrestrial Integrity, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
3.1A	Yes[2]	Yes	Yes	No[1]	Yes	Yes	No	Yes[3]
3.1W	No	Yes	Yes	No	Yes	Yes	No	Yes[4]
3.2D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3.2U	No	Yes	Yes	No	Yes	Yes	No	Yes

[1]Except for road crossings.
[2]For aquatic habitat or watershed improvement/restoration purposes only.
[3]Trail construction allowed if consistent with riparian management objectives defined in site-specific analysis.
[4]With consideration of existing road/trail densities.

Prescription Category 4: Recreation Needs and Opportunities, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
4.1	No	Yes	Yes	No	Yes	Yes	No	Yes
4.2	No	Yes	Yes	No	Yes	Yes	Yes	Yes
4.3	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
4.4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4.5	Yes	Yes	Yes	Yes	No	No	Yes	Yes

Prescription Category 5: Forested Vegetation Needs and Opportunities, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
5.1-5.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 6: Rangeland Vegetation Needs and Opportunities, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
6.1-6.2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prescription Category 8: Concentrated Development Areas, Alternative 7

Prescrip-tion	Timber Harvest	Veg/Fuel Treatment	Prescribed Fire	Road Building	Grazing	Wildland Fire Use	New Rec Devel.	New Trail Constr.
8.1	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Alternatives Considered But Eliminated From Detailed Study

A large number of alternatives were considered and eliminated from detailed study. Given the size of the area under consideration and the number of decisions being made, there is an almost infinite array of possibilities for combining different alternative components in different ways and for variations in mapping. Our alternative development process involved many iterations of developing options in various combinations and then reviewing the total range to see if we had included the key differences highlighted in public responses. Some respondents to the DEIS suggested specific line changes on maps in order to improve manageability or encompass a preferred outcome on a particular favorite place. While these suggestions were read and considered during formulation of the additional Alternative 7, we did not make these changes to the six alternatives presented in the DEIS because they did not make a substantive difference to the overall range of alternatives. A number of alternatives were not fully developed because they closely resembled alternatives that were considered in detail; they did not meet the needs for change; they were outside the realm of forest plan decisions; or they were inappropriate for reasons described below.

No or Multiple Management Prescription Categories Alternatives

During the alternative development workshops in the fall of 1999 concerns about the use of Management Prescription Categories were raised and requests were made either to not use them at all, or to place multiple prescriptions on a single area of land. The concern expressed was that by mapping management prescriptions, the multiple use concept would be violated and opportunities for conflict resolution among competing uses would be reduced. The purpose of prescription categories and their use in planning across the nation was explained along with extensive discussions about consistency with the Multiple Use Sustained Yield Act. (See the Revised Forest Plan Management Direction Package for this explanation.) We explained that the intent of prescriptions was not to allow one use to “trump” another and that conflicts between uses must be resolved locally based on the specific merits of the situation using the prescription along with other management direction to guide decisions. After numerous letters, meetings, and re-writes of the Management Direction Package of which prescriptions are a part, the notion of using prescriptions was finally accepted by the majority of participants. However, the concerns raised are important and clarifications based on these concerns have become an essential component of our Management Direction in the Revised Forest Plan. This Direction consists of goals, objectives, standards, guidelines, management prescriptions, recreation opportunity classes, scenery management objectives, desired future conditions, and monitoring and evaluation. It is the essence of the revised forest plan and is integral to implementing the suite of laws and policies pertaining to national forest management.

Comments on the DEIS also resulted in changes and clarifications of Management Prescriptions described earlier in this Chapter under the heading “Changes to Prescriptions Between Draft and Final”.

Travel Management Decisions

There were a large number of comments and suggestions related to Travel Management Planning. From the beginning of the revision process we informed participants that we had

current Travel Management Plans (or are in the process of revising them in the case of Evanston and Mountain View Districts) with designated routes identified for non-winter motorized use and areas identified for winter motorized use. Our evaluation of these plans coupled with rising interest and concern over snowmobile access lead the Forest Supervisor to define the scope of plan revision analysis to include decisions about areas open or closed to winter motorized use but not to revisit individual routes designated as open for non-winter motorized travel.

A number of national forest planning efforts in recent years have attempted to address the entire year-round, route-by-route travel management issue during forest plan revision. These efforts have resulted in the need for extensive site-specific analysis required for this type of decision by the National Environmental Policy Act, across the very large land area encompassed by a national forest. The contentious nature of the issues combined with this need for very detailed analysis has detracted from other important decisions to be made in revision and regional planning experts no longer recommend the practice. This fact along with the fact that we have completed site-specific analyses already for our travel management plans in recent years were the basis for eliminating alternatives based on suggestions or comments related to non-winter travel management. On the other hand, since forest plan decisions do include area allocations, and since the rapid increase in snowmobile and other winter recreation activities has happened since the completion of most of our current travel maps, the Forest Supervisor felt it was appropriate to address the decision of where winter motorized and non-motorized uses should be allowed in the revision and to integrate that decision with a number of other land allocation decisions required by the National Forest Management Act. Examples of comments that were related to this category of alternative include the following:

- Develop a non-motorized access plan to forest boundaries.
- Ban motorized recreation in the Tri-Canyon Area.
- Prohibit OHVs in inventoried roadless areas.
- Reopen roads that have been closed in the past.

Comments on the DEIS and Proposed Plan highlighted concerns about the adequacy of Travel Management Plans for Ogden, Salt Lake, and Logan Ranger Districts given that demand specifically for motorized trails (50 inches wide or less) has grown so rapidly because of increases in the number of ATVs. Also noted was the desire for loop trails for motorized use in these areas. Even with these concerns highlighted, the logic explained above still holds and Travel Management decisions for summer will require additional site-specific analysis. The need for this work is recognized and addressed as an Objective in the Revised Forest Plan. For a discussion of the relationship of Recreation Opportunity Classes and future Travel Planning see the section earlier in this Chapter under the heading “Changes to ROS Application Between Draft and Final and Relationship to Travel Planning.”

All Inventoried Roadless Areas Recommended for Wilderness

Some people who commented on the DEIS stated that there should be an alternative that recommends all inventoried roadless areas as wilderness. A review of Appendix C1 shows that not all of the inventoried roadless areas within the Wasatch-Cache National Forest are of equal quality with regard to wilderness characteristics. Capability is the first of three categories evaluated in making wilderness recommendations. We believe that it would be unreasonable to recommend areas with low quality wilderness characteristics (i.e. low “capability”) such as those

with many roads cherry-stemmed into the area, a high degree of evidence of past human activities (i.e. a low degree of naturalness), limited opportunities for solitude because of nearby development and or existing heavy use patterns, just because the areas met the definitions used in inventory of roadless areas. Alternative 1 was designed to provide the maximum reasonable recommendation for wilderness from the larger pool of inventoried roadless areas.

No Livestock Grazing Alternative

Some plan revision participants requested that a "no grazing alternative" be analyzed or that we should consider phasing out livestock grazing in roadless areas or wilderness as an alternative. The National Forest Management Act does require that we address rangeland capability and suitability, which we have in this FEIS. We have analyzed alternatives using different suitability criteria such as removal of riparian areas and/or uplands in unsatisfactory conditions, or removal of areas because of conflicts with bighorn sheep or heavy recreation use, however none of these results in "no livestock grazing." We do not believe it is reasonable to use a criterion such as "roadlessness" for determining suitability for livestock grazing. There is no direct relationship between roadlessness and any conflict with or impact from livestock grazing. As for using Wilderness as a suitability criterion, Section 303 of the Utah Wilderness Act of 1984 specifically states that recreation conflicts alone would not be the determining factor in the removal of livestock from those newly established Wilderness Areas, however, resource conditions could be cause for reductions in livestock numbers.

Allotment Management Planning generally does include analysis of a "no grazing alternative" with the necessary Allotment level site-specificity for making such a determination. Grazing Permits are a long-term authorization to graze livestock subject to Forestwide Standards and Guidelines, as well as Allotment Management Plans and Annual Operating Instructions. Changes to these direction documents must be based on site-specific environmental analysis and/or monitoring and administrative actions not encompassed at the broad scale of Forest Plan Revision.

This FEIS addresses the disposition of vacant allotments, and compares alternatives that use differing criteria for rangeland suitability. See FEIS Chapter 3, Topic 7 for a discussion of livestock grazing related decisions being made in this Plan revision. The Revised Forest Plan does include standards and guidelines designed to improve conditions of rangelands on the Forest. It also includes Objectives specifically aimed at improved management of livestock grazing.

Human Carrying Capacity Determinations and User Densities

A number of revision participants requested that an alternative include either a determination of human carrying capacity for key areas or a commitment to complete such a study as part of an alternative. The revision team spent considerable time exploring various approaches to addressing this. We reviewed research on the subject, talked to other recreation managers both in the Forest Service and in other agencies, and met with local academic experts on the subjects of social science and recreation management. We are incorporating our conclusions into this revision and they are as follows. Research has shown that people are more willing to accept numbers of other people than impacts from other people (Dale Blahna, personal communication, 2000). Carrying capacity conceptually is about "outputs", not "outcomes". Most current

ecosystem management and even strategic planning emphasizes outcomes. At this time we think qualitative descriptions of conditions visitors can expect to find are a more useful tool for managing sustainable recreation than focusing on numbers of people.

The carrying capacity concept came from natural and biological systems in which the implication is that there is a point of biophysical collapse. For recreation, any concept of capacity must come from a description of a desired future, very little of which will be represented by numbers. The critical indicators are where, how and when people are recreating. Recreation user's behavior and expectations are more defining than numbers of people. Furthermore, there is more merit to limits being applied to low-use rather than high-use areas. Placing upper-limit capacities on highly used areas only displaces that use to more lightly used areas, spreading and increasing impacts to biophysical resources, affecting experiences of people already using the lower density areas, and ultimately homogenizing recreation experiences. It may be more appropriate to harden highly used sites to reduce biophysical impacts and keep people where this mitigation is provided. Finally, any consideration of user density problems needs to be addressed at appropriate scales. Both broader scale regional assessments and finer scale local analysis are needed. Research has shown significant differences even between what adjacent communities may want from their public lands. The forest plan revision cannot accomplish this specific need.

Therefore, we have incorporated two changes between Draft and Final to address some of these concerns. First, given that the original concerns about human carrying capacity were focused on the Central Wasatch area because of the public supply watersheds there, Alternative 7 applies the Management Prescription 3.1w emphasizing watershed, rather than the series of recreation focused prescriptions applied in the Draft Preferred Alternative 6. This change was made to ensure that watershed protection is appropriately emphasized as demand for recreation in these canyons continues to grow. Second, with regard to the social concerns about user densities and providing for some areas with relatively lower densities in the future, we have refined the primitive and semi-primitive recreation opportunity classes (see FEIS Appendix D-2) to include ranges of user contacts that will establish thresholds. When monitoring shows that thresholds are being approached in areas mapped with the semi-primitive class, that will be the trigger for initiating public involvement in evaluation of whether to take actions to maintain densities below thresholds (through permit systems or other mechanisms) or to amend the recreation opportunity class to allow for growth.

No New Special Uses for Commercial Purposes

While this particular suggestion is not a part of any specific alternative, it is addressed in the Revised Forest Plan. Direction for Special Uses is included in the Forestwide Goals, Guidelines, and in Revised Forest Plan Appendix X Implementation Guidance where criteria are provided for evaluating proposed outfitter guide special uses.

Wilderness Recommendation in Alternative 4 (No Action)

It was suggested that wilderness recommendations should be included in this alternative because of the requirement to reevaluate inventoried roadless areas as a part of revision. After development of the full range of alternatives we believe that an adequate range of reasonable alternatives for wilderness recommendations is presented without adding this to the No Action

Alternative. This alternative serves as a baseline for contrasting other alternatives with continued management under the 1985 Forest Plan as amended.

Add Large Predators as Management Indicator Species

Some revision participants requested that large predators should be used as management indicator species (MIS).

The 1982 NFMA planning regulations at CFR 219.19 (a) (1) state "In order to estimate the effects of each alternative on fish and wildlife populations, certain vertebrate and/or invertebrate species present in the area shall be identified and selected as management indicator species and the reasons for their selection will be stated. These species shall be selected because their population changes are believed to indicate the effects of management activities (emphasis added). In the selection of MIS, the following categories shall be represented where appropriate: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality. On the basis of available scientific information, the interdisciplinary team shall estimate the effects of changes in vegetation type, timber age classes, community composition, rotation age, and year-long suitability of habitat related to mobility of MIS. Where appropriate, measures to mitigate adverse effects shall be prescribed."

Large predators were not chosen as MIS because they did not meet three of the six criteria used to select MIS (Appendix J). Criteria not met were: 1-MIS must have a strong (but not exclusive) affinity for the habitat type; 2- The habitat type is key habitat in the life cycle of the MIS; and 4- The MIS is relatively easy to monitor, i.e., high visibility and in adequate numbers, above.

The CUFF Alternative

This Alternative was proposed in public comments on the DEIS. It suggested several prescriptions for suitable timber that would allow harvest in inventoried roadless areas. DEIS Alternative 5 already did this, Alternative 3 allows harvest in most roadless areas, and FEIS Alternative 7 allows timber harvest in selected roadless areas by applying prescriptions that allow this activity. New prescriptions were proposed: Timber with Wildlife Emphasis, was very similar to DEIS prescription 5.1 although it included road density and opening size restrictions for wildlife habitat. The Revised Forest Plan which could be implemented with any Alternative includes standards and guidelines that address both road construction and patch sizes desired for various vegetation types. Big Game Winter Range, while not a separate prescription, is addressed in numerous places in the Revised Plan including standards and guidelines, winter recreation mapping, mapping of Terrestrial Habitat Emphasis (prescription 3.2) and desired future conditions. Backcountry Motorized Emphasis, would allow cross-country motorized travel. This conflicts with both Wasatch-Cache National Forest policy and the Statewide agreement for an open on designated routes approach to OHV management. Visual Quality Protection would emphasize maintaining existing visual quality within major travel corridors. The Scenery Management System applied in all FEIS alternatives achieves this emphasis while

allowing for a variety of multiple use prescriptions. The CUFF Alternative is similar enough to Alternative 5 to be represented by it with very similar environmental effects.

The Balanced Alternative

This Alternative was proposed in public comments on the DEIS. It started with DEIS Alternative 5 and made changes to provide additional protection in some areas. This Alternative set forth detailed recommendations for prescriptions to be mapped in particular areas of the Logan Ranger District. It suggested that additional motorized trails be allowed on the easterh half of Logan and Ogden Districts, which is a future site-specific Travel Planning decision. It suggested ski area expansion be allowed and least constraints which Alternative 5 does, and it suggested watershed protection in specific areas which Alternative 7 does. The recommendations for this Alternative with detailed responses can be reviewed in FEIS Appendix A, Comment #151. Components suggested are included in one or more alternatives and analyzed in this FEIS.

Comparison of Alternatives

This section is a summary of key differences between alternatives for management prescriptions, projected activities and outputs, suitable lands, summer and winter recreation opportunities, inventoried roadless area disposition, and annual employment and labor income. Additional important details for each resource topic area are found in Chapter 3.

Table 2-1. Comparison of Alternatives Acres[2] by Management Prescription

	Alternatives						
	1	2	3	4	5	6	7
1.0 Wilderness							
1.1 Existing Wilderness - Opportunity Class I	178,000	178,000	178,000	61,900	178,000	143,200	143,200
1.2 Existing Wilderness – Opportunity Class II	105,800	105,800	105,800	98,300	105,800	139,400	139,400
1.3 Existing Wilderness – Opportunity Class III	25,100	25,100	25,100	19,600	25,100	26,200	26,200
1.4 Existing Wilderness - No Class	0	0	0	129,200	0	0	0
1.5 Recommended wilderness	388,900	145,900	51,500	0	0	69,400	73,500
2.0 Special Management Areas							
2.4 Research Natural Areas	5,600	5,600	4,600	6,200	5,300	5,600	5,600
2.5 Scenic Byways	20,600	20,600	20,600	22,000	23,100	22,800	21,100
2.6 Undeveloped Areas	*197,900*	192,000	85,000	0	2,000	88,500	111,200
2.7 Special Interest Areas and Special Areas	17,100	32,500	900	0	1,000	16,600	18,600
3.0 Protection, Maintenance or Restoration of Aquatic/Watershed or Terrestrial Integrity							

[2] Rounded to nearest 100 acres.

	Alternatives						
	1	2	3	4	5	6	7
3.1 Aquatic Habitat/Watershed Emphasis	138,200	181,500	158,600	106,400	70,400	186,000	0
3.1a Aquatic Habitat	0	0	0	0	0	0	28,300
3.1w Watershed Emphasis	0	0	0	0	0	0	154,600
3.2 Terrestrial Habitat Emphasis	86,800	138,200	201,600	11,500	24,600	218,300	0
3.2d Terrestrial Habitat Emphasis – developed	0	0	0	0	0	0	89,200
3.2u Terrestrial Habitat Emphasis – undeveloped	0	0	0	0	0	0	122,300
4.0 Multiple Resource Uses With Recreation Needs and Opportunities							
4.1 Backcountry Non-motorized Recreation Settings	3,200	30,000	56,700	126,700	104,000	19,900	13,000
4.2 Dispersed Non-motorized Recreation Settings	4,500	3,600	3,200	3,900	20,500	20,000	3,500
4.3 Backcountry Motorized Recreation Settings	16,000	25,000	30,600	1,800	17,300	32,600	27,100
4.4 Dispersed Motorized Recreation Settings	30,900	38,300	41,700	16,600	78,200	49,100	53,800
4.5 Developed Recreation Areas	12,200	13,100	12,300	13,800	22,200	11,900	12,000
5.0 Forested Vegetation Management Needs and Opportunities							
5.1 Maintain/Restore Forested Ecosystem Integrity	0	69,800	56,100	41,600	100	73,500	81,100
5.1/6.1 Mixed Forested/Rangeland Ecosystem Integrity	200	200	88,700	0	0	17,300	17,300
5.2 Manage Timber for Growth and Yield	0	0	43,800	251,000	182,100	34,800	34,500
5.2/6.2 Mixed Manage for Timber/Forage	0	0	0	0	186,000	0	0
6.0 Rangeland Vegetation Management Needs and Opportunities							
6.1 Maintain/Restore Rangeland Ecosystem Integrity	5,300	31,300	35,500	61,000	54,300	60,000	60,000
6.2 Manage for Livestock Forage Production	0	0	36,300	264,700	137,600	1,600	1,600
8.0 Concentrated Development Areas							
8.1 Mineral and Energy Development	3,000	3,000	3,000	3,000	3,000	3,000	3,000

Assumptions For Projected Activities and Outputs

The following listing of activities and projected outputs is based on best estimates of some of the types and amounts of various work that could be completed to move toward desired conditions for the Forest during the planning period (10 years). A number of factors can affect whether and how much of any given activity actually can be implemented. Budgets are determined annually based on what Congress appropriates for Forest Service projects and operations. Dollar amounts are allocated for specific “program areas” such as watershed, wildlife and fish, recreation, timber minerals, range, etc. at the national level. These funds are then allocated to each of the Regions of the Forest Service and subsequently divided among all of the National Forests within a given Region. The mix of funds at the individual National Forest level can vary based on how much and in what program areas Congress appropriated dollars as well as how these dollars are then

allocated to each level of the Forest Service. In the case of activities such as oil and gas exploration and development, implementation is dependent on private sector proposals and actions rather than Forest Service action. Prior to implementation of most projects, there is required environmental analysis and planning that includes public review and comment as well as opportunities for appeals and litigation. Projects may be changed, delayed or even abandoned depending on the results of these processes. As new issues and new information arise changes in priority and needs for action may change. Recent emphasis on fire management and wildland urban interface fuels reduction through the National Fire Plan is a good example of this. Therefore the following should be viewed as a set of estimates or projections subject to numerous adjustments based on the factors described above.

Table 2-2. Comparison of Alternatives For Projected Activities and Outputs

	Alternatives						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Watershed Health (Total for 10 year planning period)							
Soil and Water Improvement Projects[1]	0	20	20	20	20	20	20
Aquatic Resources Improvement Projects[1]	0	50	15	20	10	25	25
Vegetation Treatments (Total acres for 10 year planning period)							
Prescribed Fire- Aspen & Aspen/Conifer Mixed[2]	0	80,000	32,000	7,200	7,200	32,000	32,000
Aspen/Conifer Vegetative Treatment[2]	0	6,500	5,250	6,250	3,100	3,000	5,000
Aspen/Conifer Commercial Harvest (acres) from MPC 5.2[2]	0	0	2,250	6,250	12,400	2,000	3,500
Prescribed Fire- Douglas-fir (non-lethal) [2]	0	4,000	2,000	0	0	2,000	2,000
Prescribed Fire- Sagebrush[9]	0	40,000	20,000	10,000	10,000	20,000	30,000
Mechanical Treatment- Oak[2]	0	16,000	8,000	0	8,000	8,000	20,000
Prescribed Fire- Oak[2]	0	40,000	20,000	8,000	20,000	20,000	8,000
ASQ/TSPQ Volume (MMBF-Annual) [3]	0 / 0	0 / 2.1	1.6 / 3.2	3.3 / 6.2	6.2 / 7.8	2.0 / 3.9	2.0/4.5
Range Livestock (annual)							
Cattle Average AUMs	31,980	28,820	33,940	34,180	34,180	31,980	33,560
Sheep Average AUMs	23,160	20,870	24,580	24,750	24,750	23,160	24,300
Forest-wide Livestock Average AUMs[4]	55,140	49,690	58,520	58,930	58,930	55,140	57,860
Roads and Trails (Total for 10 year planning period)							
New Timber Harvest Road Construction (miles) [1]	0	6	39	49	49	6	7
Projected New Oil and Gas Exploration Roads (miles) [5]	3	3	6	0	10-11	6	7.5

	Alternatives						
	1	2	3	4	5	6	7
Projected New Oil and Gas Development Roads (miles) [5]	0	0	4	0	4	4	4
Roads Closed to Motorized Use from Wilderness Recommendation (miles) [6]	2	0	0	0	0	0	0
Trails Closed to Motorized Use from Wilderness Recommendation (miles) [7]	76	7	0	0	0	0	0
Recreation							
Projected Number of New Developed Recreation sites during Planning Period[1]	0	2	2	2	2	2	2
Projected Number of Recreation Facilities Maintained or Rehabilitated during Planning Period[1]	10	10	10	10	10	10	10
Concentrated Use Areas Managed							
Ski Area Expansion	0	0	0	0	1-5	0	0
Oil and Gas Exploration and Development (Total for 10 year) planning period							
Projected New Oil and Gas Exploration Well Pads[4]	2	2	4	0	7	4	5
Projected New Oil and Gas Fields Developed[5]	0	0	1	0	1	1	1

[1] Source: K:\pao\forest_plan\deis\alternatives\comparison.assumptions_by_resource_area_03082001.doc
[2] VDDT model was used to estimate how vegetation would change over time. Estimates for prescribed fire, mechanical treatments, and harvest levels were based on budget constraints, mitigation requirements, standards and guidelines, and resources expected to be available to accomplish project planning.
[3] Source: ASQ/TSPQ values from Appendix B-1, Vegetation Modeling.
[4] AUM projections for Alternative 7 are based on 4.78 acres/AUM on satisfactory range, 6.70 acres/AUM on unsatisfactory range. For all other Alternatives AUM projections based on average of 4.78 acres/AUM on all suitable acres.
[5] WORD memo from Julie Hubbard titled “Oil and Gas Activities for Specialists While Estimating Effects 07/24/02”.
[6] From GIS information compiled by Michael Barry.
[7] From GIS EXCEL output file “miles_motorized_trails_rla_mp_alts” in K:\pao\forest_plan\deis\effects\gis_tables.
[8] From GIS EXCEL output file “acres_ros_winter_forest_FINAL.xls” in K:\pao\forest_plan\feis\acres_comparison_win_rec_a1-ec_010903
[9] 10% of these acres will be treated to return juniper to sagebrush dominance.

Table 2-3. Suitable Lands, Acres by Alternative

	Alternative						
	1	2	3	4	5	6	7
Suited[1] Lands for Aspen Timber Production	0	0	1,600	27,800	74,500	1,200	1,200
Suited[1] Lands for Conifer Timber Production	0	0	36,400	166,100	151,500	27,700	27,700
Timber Harvest Allowed "Unsuited"[2]	0	79,900	131,600	55,200	71,800	72,100	171,400
Forest-Wide Suitable Range Lands[3]		251,900	299,700	300,100	300,100	288,300	288,300
Lands Available for Oil and Gas Leasing, ASZ[4]	0	40,100	50,100	N/A	68,300	48,300	47,900
Lands Not Available for Oil and Gas Leasing, ASZ[4]	68,300	28,200	18,200	N/A	0	20,000	20,400
Total Lands Available for Oil and Gas Leasing[5]	140,400	180,500	190,500	140,400	208,700	188,700	188,300

[1] Suited by definition is only available capable lands within Prescription 5.2 or 6.2.
[2] Areas with characteristics conducive to timber harvest (capable and available), Prescriptions that allow timber harvest to meet other needs, but are "unsuited" by definition because they are not mapped with Prescription 5.2 or 6.2.
[3] Table RN-4, FEIS Appendix B-9 provides discussion of basis for projections.
[4] North Slope Appeal Settlement Zone area only.
[5] North Slope Uinta Mountains, 1994 Leasing Decision plus Revised Forest Plan Decision.

Table 2-4. Acres of Summer Recreation Opportunity Classes Existing Conditions and Alternatives

ROS Category	Alternative and Existing Condition (EC)							
	1	2	3	4/1985	5	6	7	EC
Wilderness/Primitive[1]	36,500	36,500	36,500	307,500	36,500	36,500	36,500	36,500
Wilderness/SPNM[2]	272,400	272,400	272,400	0	272,400	272,400	272,500	272,500
SPNM[3]	556,200	436,300	392,100	241,900	308,400	411,800	416,100	416,100
SPM[4]	135,800	188,700	223,600	85,600	268,800	201,400	276,800	276,800
RN(Roaded Natural)	234,600	301,500	311,100	545,600	349,300	313,400	227,900	233,600
Rural	720	720	720	13,600	720	720	6,400	720
Urban	144	144	144	0	144	144	144	144
NA[5]	0	0	0	45,200	0	0	0	0
TOTAL[6]	1,236,364	1,236,264	1,236,564	1,239,400	1,236,264	1,236,364	1,236,344	1,236,364

1 Wilderness (Prescription 1.1 only)
2 Wilderness Classified as Semi-Primitive Non-Motorized
3 Semi-Primitive Non-Motorized and Recommended Wilderness (Prescription 1.5)
4 Semi-Primitive Motorized
5 Lands acquired after 1985 Forest Plan
6 Totals differ due to GIS mapping accuracy and rounding.

Table 2-5. Winter Recreation Opportunities Alternatives and Existing Condition

Winter Recreation	Acres of Existing Condition and Alternatives							
	1	2	3	4/1985	5	6	7[1]	EC[2]
Heli-skiing	0	0	12,000	17,000	17,000	17,000	17,000	17,000
Motorized	246,800	296,700	663,600	723,300	693,900	548,700	540,700	634,800
Non-Motorized	679,200	629,800	263,000	163,400	232,600	377,900	385,900	291,600
Wilderness	308,900	308,900	308,900	307,500	308,900	308,900	308,900	308,900

[1] Alt 7 Allows motorized use in areas currently open within Recommended Wilderness (Prescription 1.5)
[2] Existing Condition

Table 2-6. Inventoried Roadless Acres Disposition by Alternative

	Alternative (Acres)						
Acres in Prescriptions that:	1	2	3	4	5	6	7
Maintain[1] Roadless Area Values Acres	606,000	546,200	366,900	0	7,200	191,200	188,700
Percent of Total Roadless	100%	90%	60%	0%	1%	32%	31%
Mostly Maintain[2] Roadless Area Values Acres	0	39,200	58,100	131,900	109,900	389,400	267,400
Percent of Total Roadless	0%	7%	10%	22%	18%	64%	44%
Allow Development Acres	0	20,600	180,900	474,000	488,800	25,300	149,900
Percent of Total Roadless	0%	3%	30%	78%	81%	4%	25%

[1]No new road construction, timber harvest, new trail or recreation facilities construction, or mechanical fuels treatments allowed.
[2]No road construction and/or timber harvest allowed; New trail construction, minimal recreation facilities construction, and mechanical fuels treatments are allowed.

Table 2-7. Average Annual Employment by Program by Alternative (Decade 1)

Resource	Current	No Action	Alternatives 1	2	3	5	6	7
	- - - - - - - - average annual employment, jobs- - - - - - - -							
Recreation/tourism	5,510	5,982	5,960	5,977	5,993	6,002	5,993	5,993
Wildlife and fish	80	88	88	88	88	88	88	88
Grazing	35	35	33	29	35	35	33	34
Wood products	60	60	0	18	25	63	33	37
Minerals	89	89	52	52	210	251	210	227
Forest Service expenditures	393	393	394	392	392	392	392	392
Total forest management	6,167	6,647	6,527	6,556	6,743	6,831	6,749	6,771
Percent change from current	---	8%	6%	6%	9%	11%	9%	10%

Source: MIG 2002.

Table 2-8. Labor Income estimated by Program by Alternative (Decade 1)

Resource	Current	No Action	Alternatives 1	2	3	5	6	7
	- - - - - - - - average annual, in millions of dollars- - - - - - - -							
Recreation	108.2	117.6	117.0	117.4	117.8	117.9	117.8	117.8
Wildlife and Fish	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Grazing	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5
Wood products	1.4	1.4	0.0	0.4	0.6	1.4	0.8	0.8
Minerals	4.5	4.5	2.6	2.6	10.6	12.6	10.6	11.4
Forest Service expenditures	12.4	12.4	12.4	12.5	12.5	12.5	12.5	12.5
Total forest management	128.6	138.2	134.3	135.1	143.8	146.7	144.0	144.8
Percent change from current	---	7%	4%	5%	12%	14%	12%	13%

Source: MIG 2002.

The Preferred Alternative

The Regional Forester has selected Alternative 7 as the decision (selected) alternative.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Introduction

Delineating Ecosystems

Originally, in the Preliminary Analysis of the Management Situation (USFS, 1999) we identified delineating ecosystems as the first in a series of steps for implementing ecosystem management. Because the planning regulations require decisions be made at the national forest administrative boundary level, we must use the national forest boundary as one broad scale. We recognize the artificial nature of this delineation so we have chosen to reference broad, mid, and fine scales for the revision analysis.

Both biophysical (plants, animals, land, and water) and human (social, economic, and political) scales to be considered vary with activity and/or issues. For example, vegetation can be easily described at a relatively broad scale because of similar land capabilities and common associations of plant communities. Recreation uses on the other hand are more easily and appropriately described at a finer scale based on facilities and access from population centers.

Broad Scale - Ecological Sections

At the broad biophysical scale the Wasatch-Cache National Forest is a part of three large geographic areas ("Sections") – the Uinta Mountains, Overthrust Mountains, and Bonneville Basin Sections as defined by McNab and Avers (1994). Each Section has its unique geology, climate, vegetation, wildlife and associated ecologies. The Wasatch and Bear River Ranges of the Overthrust Mountains Section, the Stansbury Mountains portion of the Bonneville Basin, and the Northern portion of the Uinta Mountains Section are used for description and analysis of vegetation as well as disturbance processes such as fire, insects and disease, and noxious weed invasion.

Mid and Fine Scales - Management Areas and Watersheds

As work proceeded we discovered that our earlier delineation of fine scale areas (watersheds at the 5th hydrologic unit code) dividing the Forest into 36 areas was too fine a scale for the data we have on hand and for some of the types of decisions being made in Forest Plan revision. We have now grouped those 36 watersheds into 7 "Management Areas" for the purpose of this FEIS. These are delineated on watershed boundaries, which combine similar lands with common access to people into recognizable but larger areas for description and analysis. These are shown on the map "Management Areas for the Wasatch-Cache National Forest" in this section. In cases where there is a specific need to consider a finer scale, we have used the original watershed delineations for reference. We have used the Management Areas for description and analysis of watersheds and aquatic resources. For recreation we have used portions of Management Areas (with data compiled by Ranger District) because of specific access or issues. Much of the

economic analysis is based on County boundaries because that is how the available data is organized. There is also a full ten county scale with rural portions of those counties highlighted separately.

Management Areas

The following Setting descriptions of each Management Area are provided to "paint a picture" for the reader of the prominent features in the area and what one might expect to see if the area was traversed. The remainder of the Chapter is arranged by Topic such as "Watershed Health" with affected environment and environmental consequences described at the scale or scales most appropriate to that topic.

Bear Management Area Setting Description:

The Bear management area is located along the western front of the Bear Lake valley in Northern Utah. It forms the east slope of the Bear River Range and creates the border for three ecological subsections Bear River Highlands, Bear Lake Section, and Monte Cristo-Weber Valley Hinterlands (Bailey, 1994). This transition area has a mosaic of vegetation types, with conifer, aspen and mountain mahogany at higher elevations and sagebrush and grass on the lower slopes. Infrequent broad canyons descend from the upland to the base of the Bear Lake valley. The Ogden River scenic byway (Highway 39), and Logan Canyon scenic byways wind their way down the slope of the Bear management area. Scenic overlooks provide exceptional views of Bear Lake, contrasted with the upland desert beyond. Year-round recreationists can find trails, primitive roads, camping spots, and open snow play fields to explore. Cattle and sheep can be seen grazing on rangelands in the area. Forest openings resulting from vegetation management approximate historic patterns. Monte Cristo and Sunrise campgrounds provide a pleasing setting for recreation amidst quaking aspen, lodgepole pine and Douglas-fir.

Cache Box Elder Management Area Setting Description:

The Cache-Box Elder management area is located in the northeast mountain ranges of northern Utah. The management area covers three ecological subsections (Bailey, 1994), Bear River Highlands, Cache Front and Wellsville Mountains. The diverse character of the well-defined plateaus, wide valley floor, and sharply rising mountains is the consequence of a turbulent geologic history. The limestone walled canyons are a result of sediment left by a shallow tropical sea. Glaciated cirques and upland basins are the result of ancient glaciers. Faults and sinking valley blocks created the steep mountain slopes and the multi level lineal benches are the remnants of Lake Bonneville. The two mountain ranges included in this unit are the Bear River Mountains and the Wellsville Mountains, with elevations ranging from 5,000 to 10,000 feet.

The portion within the Bear River Highlands on the east has rolling uplands cut through by valleys. Mixed conifer stands (Engelmann spruce, subalpine fir, lodgepole pine, limber pine, and Douglas-fir) form a mosaic with aspen, maple, shrublands and grasslands. In many aspen stands the dark green conifers can be seen rising up through older, decadent aspen. Livestock can be seen grazing on gentler slopes throughout the area. Fences and water developments are constructed to better distribute livestock for appropriate use of forage. The mostly unpaved road

system forms a series of corridors along which recreation thrives, primarily on weekends. Visitors engage in activities including scenery viewing, camping, hunting and fishing, all terrain vehicle (ATV) riding, hiking and horseback riding. In the winter, deep snow packs blanket open flats and rolling hills, providing outstanding recreation opportunities, such as snowmobiling, skiing, snow shoeing and sledding. In the higher elevations, snow covered peaks and bowls with wind swept cornices provide a contrast to the gentle slopes and flat lands.

Canyons within the Cache Front are deep, with sheer limestone walls and cliffs. These canyons provide unique habitats for a number of endemic plants. Logan Canyon Scenic Byway (Highway 89) travels along the Logan River and Beaver Creek, dropping down into the Bear Lake Valley below, providing outstanding opportunities for scenery viewing. Recreation is a major feature in these canyons. Developed recreation facilities include campgrounds, summer homes, picnic areas and trails. Popular recreation activities in this unit include fishing and hunting, kayaking, picnicking, biking, rock climbing, hiking, snowmobiling, and ATV-riding, as well as scenery and wildlife viewing. North facing slopes in these canyons support mixed conifer-aspen stands at the higher elevations contrasted with maple and mountain brush at lower elevations. Oak occurs in the southern portion of the unit. Junipers dot the south and west facing, grass covered slopes. The contrast between these vegetation types is especially apparent in the fall as the aspen, maple and oak leaves change colors, creating a remarkable scenic attraction. Wilderness opportunities for solitude, challenge and primitive recreation are provided in the Mount Naomi Wilderness.

The Wellsville Mountains are at the northern end of the Wasatch Mountains, jutting out of the Cache and Great Salt Lake valley floors, creating a north-south wall between these valleys. On the east side, maple dominates the lower slopes and is interspersed with aspen at mid elevations. Conifers reach down from higher elevations along north-facing slopes of the steep, short side canyons, creating fingers of dark green. On the west facing side, steep, rocky slopes and extensive cliffs are prominent. The Wellsville Wilderness provides opportunities for solitude and challenge, with hiking and horseback riding being the dominant recreation uses.

North Wasatch Ogden Valley Management Area Setting Description:

The North Wasatch Ogden Valley Management Area is located in the Wasatch Mountains of northern Utah. The Area covers two ecological subsections, Monte Cristo Hinterlands and Northern Wasatch. Managed by three Ranger Districts, Logan, Ogden, and Salt Lake, this Management Area forms the west-facing slope of the Wasatch front and goes east to the divide between the Cache and Bear Lake Valleys. The Wasatch Front is composed of deep V-shaped canyons cut through the benches of ancient Lake Bonneville and forming pyramidal shapes that mirror into the Great Salt Lake. North facing slopes support mosaics of dark green conifer of varying densities. Scrub oak and mountain mahogany are found on the dryer slopes along with talus, rock cliffs and grassy side hills creating scattered openings. Cottonwood, dogwood, willow, birch and cherry occur along streams to their headwaters. Horizontal lines can be seen on the upper slopes left from early efforts to stabilize watersheds.

The northwestern part of the North Wasatch is characterized by jagged, craggy pinnacles and ridgelines supported by eroded rock ramparts. Ben Lomond Peak spires to an elevation of 9,712

feet, overlooking surrounding landscapes. To the east from Ben Lomond, Mount Ogden, and Francis Peak abut moderately defined drainages through subalpine stands of coniferous forest. Large basins include talus slopes, conifer patches, and aspen groves. On lower slopes oak, mountain shrub, and maple cover rolling foothills into the valleys. In Ogden Valley, Pineview Reservoir's footprint is surrounded by a rural patchwork of fence farmsteads, pastures, farmlands and small rural communities. Trappers once called the valley of the convergence of three rivers "Ogden's Hole" because of the plentiful trapping for beaver. The valley has changed over time and now includes the rural communities of Ogden Valley along with the popular water playground Pineview, attracting visitors from Ogden and surrounding communities.

Ridgelines and broad valleys covered in aspen, scrub, and sage flat mosaics create a landscape prime for both winter and summer recreation. Connecting canyons provide places for weekend campers who enjoy developed and undeveloped camping. Conifer stands of lodgepole pine, Douglas-fir and subalpine fir, mingled with aspen cover the eastern flank of this unit where cattle and sheep graze the grassland openings.

Near Causey Reservoir numerous rock outcrops can be seen jutting from the mountainsides. Mostly subalpine fir is found on north facing slopes in the Monte Cristo area, while Douglas fir is on north facing slopes along the Wasatch Front. An intermingled public/private land ownership pattern is evident across much of the area. Watershed improvements from 1930's Civilian Conservation Corps work is still evident in the Davis and Willard Peak areas. Most of the Front is acquired private land that did not become National Forest until the 1930s' after floods and degradation in the earlier part of the century. Major utility corridors are located across the forest in this area. Davis County, especially the area along the Front, is very arid even at the higher elevations. East and West Canyons are also a part of this Management Area.

Central Wasatch Management Area Setting Description:

Located east of Salt Lake City in the Wasatch Mountain Range, the Central Wasatch Management Area extends from the Davis and Salt Lake County line on the North to the Salt Lake and Utah County line on the South. It contains three designated Wilderness areas, Mt. Olympus, Twin Peaks, and Lone Peak and four major ski areas, Brighton, Solitude, Alta and Snowbird. The canyons in this area are valuable watersheds for Salt Lake and adjoining cities along the Wasatch Front.

Seven major canyons comprise the Central Wasatch Area. These range from broad, gentle sloping drainages in the north to steep narrow drainages in the south. Mountain peaks rise nearly seven thousand feet above the Salt Lake Valley. Lone Peak reaches an elevation of 11,253 feet and provides an impressive backdrop to the valley below. The U-shaped canyon of Little Cottonwood Creek rises from typical stream bottoms of cottonwood, willow and dogwood to the granite, red-quartzite and limestone walls of the upper mountainside. The circular basin at Brighton to the north drains into the V-shaped canyon of Big Cottonwood Creek. The ski areas include runs that appear similar to avalanche chutes falling from open glacial troughs through aspen and conifer stands.

Small communities such as Alta and Brighton have developed in these canyons supporting recreation, skiing, and in the past, mining activities. Each of these communities has a character of its own set within aspen and conifer stands. Developed campgrounds, picnic areas, and trailheads are located in the major drainages providing refuge from the summer heat in urban areas below. The variety of vegetation and rock types from low to high elevations provides remarkable scenery enjoyed both within the Canyons and as the backdrop to the cities along the front. Mill Creek Canyon is a highly popular area for evening and weekend picnics, hiking, biking, and running or walking with only a short drive from the city below. A wide variety of recreation opportunities are provided for a growing urban population.

Drier, more rolling mountains typify the northern end of this area in Lambs, Emigration, and Red Butte Canyons. Lower elevations, poorer soils, past fires, and historic activities have created a vegetation mosaic with patches of scrub oak, maple, grasses and forbs. Cottonwood trees and other hardwoods occur along streams in the area. Rock outcrops are common along ridges and on sideslopes creating an interesting variety of colors and textures across the landscape.

Stansbury Mountains Management Area Setting Description:

The Stansbury Mountains Management Area is located at the south end of the Great Salt Lake between Tooele Valley on the east and Skull Valley on the west. It occupies the south end of the Stansbury mountain range. North south trending, the unit rises from the valley floor and varies in elevation from 5400 feet to 11,031 feet at the top of Deseret Peak in the Deseret Peak Wilderness. This is a semi-arid range created by basin and range type faulting and defined by steep V shaped canyons, juniper forests and craggy mountain peaks. Many of the north-facing slopes are accented by dark green fingers of conifer extending down the ridgelines. Vegetation is a mosaic of juniper and Douglas-fir at lower elevations and Spruce/Fir at higher elevations. Hardwood bottoms and openings of sagebrush and grass/forb meadows also occur. Crested wheat grass was planted in the 1960's, and covers large areas at lower elevations on the east side of the Stansbury range. Native species are beginning to reestablish in these communities, but the crested wheat grass is likely to persist for decades into the future. The replacement of aspen by conifers due to fire suppression has likely resulted in lower water flows in the streams. Few perennial streams and springs are found on the Area. South Willow Canyon is the location of the only developed campground facilities. In addition, South Willow Creek is essentially completely diverted at the Forest boundary so no perennial flow occurs east of the Forest. Mining Fork has been diverted from its natural stream channel into South Willow Creek at a location near the S curves. Historically mining occurred although its remnants are no longer dominant on the landscape. Primitive roads that go up many of the canyons are braided and are creating a high impact on the landscape as people drive vehicles further up the mountain and off designated routes.

Western Uintas Management Area Setting Description:

Located in the Northeastern corner of Utah, next to the Southwestern border of Wyoming in the Uinta Mountains. The area rises in elevation from 6,800 in the foothills to 12,718 feet on Ostler Peak. This Management Area contains four ecological subsections: West Flank Uintas, High Uintas, North Slope Outwash and Monte Cristo-Weber Valley Hinterlands (Nelson, 1993) and is

managed by two Ranger Districts, Kamas and Evanston. The Western Uintas Management Area includes diverse landscapes of open sagebrush flats, aspen, and coniferous forests, high mountains, semi-circular cirque basins, deep U-shaped river valleys, grassy meadows, alpine tundra and an abundance of lakes, streams and wetlands. The high amount of wetlands in the area is a unique feature compared with other areas in the intermountain west. It offers a wealth of recreation opportunities such as backcountry hiking and horseback riding, ATV trails, fly-fishing, scenic driving, rock climbing, backpacking, mountain biking, hunting, peak bagging, large group/family camping, snowmobiling, snowshoeing and cross-country skiing. Cattle or sheep can be seen grazing in portions of the area, as well as elk, deer, and moose.

Created by glaciers, this landscape is composed of broad vistas of deep U-shaped valleys coursed by mountain streams that tumble down steps of hard quartzite stone, and meander through open grassy meadows with lush riparian borders. At the heads of these U-shaped valleys are majestic domed peaks and stacked blocked ridgelines whose concave bases are blanketed with conifer and patches of aspen. Large and small lakes that reflect the surrounding peaks are scattered across the landscape. Rolling uplands provide large open snowfields mingled with conifer and aspen stands in winter that in summer provide a vivid display of colorful wildflowers. Campgrounds, trailheads and visitor pullouts follow the gentle weaving alignment of Mirror Lake Scenic Highway as it climbs from broad valleys through the Upper Provo River Canyon to the summit. There, Bald Mountain is at the headwaters of four of the most important river systems in Utah (Duchesne, Provo, Bear, and Weber) and swirled quartzite originally arising from ancient ocean bottoms has been polished smooth by Pleistocene Glaciers. Bald, Murdock, Hayden and many other peaks stand on the horizon as sentinels with coats of talus and craggy cliff bands.

Eastern Uintas Management Area Setting Description:

Located in the Uinta Mountains, the largest east/west mountain range in the lower 48 States, and found in the northeastern corner of Utah and the southern border of Wyoming, the Eastern Uintas Management Area ranges in elevation from 8,000 feet along the northern Forest boundary to 13,442 feet at Gilbert Peak. Within this Management Area there are three ecological subsections: High Uintas, North Slope Outwash, and Phil Pico Highlands (Nelson, 1993) that are managed by two Ranger Districts- Evanston and Mt. View. The diverse landscapes of the Eastern Uintas include open sagebrush flats, aspen, mixed conifer, and pure coniferous forests, high jagged mountains, semi-circular cirque basins, deep U-shaped river valleys, grassy meadows, alpine tundra and a profusion of lakes, streams and wetlands.

The area offers a variety of recreation opportunities such as backcountry hiking, horseback riding, fishing, camping, snowmobiling, cross-country skiing, ATV riding and hunting. The area is also rich in history and community ties to national forest resource uses from extensive tie hacking for construction of railroads, to livestock grazing, oil production, timber harvest, and reservoirs for agricultural irrigation. A network of roads and trails criss-cross the lower slopes providing access for a variety of recreation opportunities and other forest uses. Traveling these routes one climbs from southern Wyoming’s gray-green sage prairies and shimmering aspen groves through deep green conifer to views of jagged barren peaks. Upper portions of the area are primarily undeveloped (unroaded) where semi-circular glacial basins pour surround streams with rich riparian vegetation. These streams often flow from mountain ice and snow melting to

lake to reservoir to mountain plain through concave valleys. Giant rock ramparts can be seen at the entrance of the three main rivers: Beaver, Henrys and Blacks Fork flowing from their headwaters in the High Uintas Wilderness. Oil wells and oil production facilities are sprinkled through the lower uplands of the landscape, mostly hidden from a distance by careful design and placement in pockets of vegetation. Remnants of bygone eras can be found throughout the landscape in sagging log cabins, wooden check dams, stumps cut waist high and historic ranger stations.

Topic 1 – Watershed Health

Soils, Water, and Geologic Resources

Introduction

This section will address existing watershed conditions and analyze the effects of the different alternatives on these resources. Within the affected watershed environment subsection, information is presented on the physiographic (geology and soils), hydrologic (streams and lakes), and climatic (precipitation and temperature) components of watersheds found on the Forest. Within the environmental consequences subsection, the direct, indirect and cumulative effects on soil and water quality are disclosed in terms of the various activities proposed in the alternatives. Comparisons are then drawn between the effects on watershed health between the action alternatives and the no action alternative.

Laws, Policy, and Direction

Numerous legal directions pertains to soil and water resources on federal, state and private lands in the United States. Those most applicable to National Forest Lands include:

- **The Organic Administration Act (1897) --** Recognizes watersheds as systems that have to be managed with care to sustain their hydrologic function. It states that one purpose for establishing national forests is to secure favorable conditions of water flow.

- **The Federal Water Pollution Control Act (1972) --** Commonly known as "The Clean Water Act", an act and series of amendments passed to maintain and restore the chemical, physical, and biological integrity of the nation's waters. It requires compliance with state and federal pollution control measures; no degradation of in stream water quality needed to support designated uses; control of nonpoint sources of water pollution through conservation or "best management practices;" federal agency leadership in controlling non-point source pollution from managed lands; and rigorous criteria for controlling pollution discharges into waters of the United States.

- **The National Forest Management Act (1976) --** Directs national forests to protect watershed conditions from irreversible damage and to protect streams and wetlands from detrimental impacts. Amended RPA by adding sections that stressed the maintenance of productivity and need to protect and improve the soil and water resources, and avoidance of permanent impairment of the productive capability of the land. Fish habitat must maintain viable populations of existing and desired non-native vertebrate species.

- **The Forest and Rangeland Renewable Resources Planning Act (RPA)(1974) --** Requires an assessment of the present and potential productivity of the land. Regulations are to specify guidelines for land management plans developed to achieve the goals of the program that "…insure that timber will be harvested from NFS land only where…soil, slope, or other watershed conditions will not be irreversibly damaged."

- **The Endangered Species Act (1973) --** Requires federal agencies to conserve threatened and endangered species and the ecosystems they depend on, including riparian and aquatic ecosystems.

- **The Safe Drinking Water Act (1976) --** Requires federal agencies having jurisdiction over any federally owned or maintained public water system to comply with all authorities respecting the provision of safe drinking water. The State of Utah has primary enforcement responsibility through its drinking water regulations.

- **Executive Orders 11988 and 11990 --** Direct federal agencies to avoid to the extent possible the impacts associated with the destruction or modification of floodplains and wetlands. Agencies are directed to avoid construction and development in flood plains and wetlands whenever there are any feasible alternatives.

- **Forest Service Manual (Section 2500) --** Provides additional laws and executive orders as well as agency policy pertaining to watershed management.

- **Forest Service Manual, Soil Management Handbook (FSH R4 Supplement 2509.18-95-1) --** Provides direction for the protection and monitoring of long-term soil productivity through the establishment of soil quality standards.

- **R1/R4 Soil and Water Conservation Practices Handbook (FSH 2509.25) --** Provides standards that must be followed.

- **Federal Agency Source Water Agreement --** effort to coordinate among federal agencies the increasing numbers of individual programs to protect drinking water sources.

Affected Environment

Watersheds contain terrestrial, aquatic, riparian, and wetland resources that include both physical and biological components. They provide critical habitat for wildlife and serve as important links between upland sites and streams by providing shade, bank stability, and filtration of pollution. Watersheds are dynamic systems that respond to disturbances by both human and natural agents. Disturbances can cause direct impacts such as flow reduction, wetland loss, and bank instability, or can produce indirect impacts in the uplands of a watershed, such as soil loss or landslides that introduce sediment to the stream. These impacts are of concern to overall watershed health. They can affect water quality and quantity, fish and wildlife habitat, and soil productivity.

Soils and geology are an integral component of ecological groupings. They influence vegetation, watershed condition, mineralogy, and land uses. Soils and geology have been used to determine the suitability of forestlands for timber sales and the effects that land management projects may have on watersheds.

In stream flows in alluvial, perennial, and fish-bearing streams are an important component of aquatic and riparian resources also. When high and low flows occur without significant artificial influence, important stream processes are maintained that protect riparian habitats and recreation and aesthetic values.

Healthy watersheds are critical to protecting water quality, sustaining dependent ecosystems, providing a reliable water supply, and preventing or reducing the downstream impacts of high runoff events. In a natural state, watersheds are in a dynamic equilibrium determined by geologic and climatic variables. Significant disturbances, whether caused naturally (e.g., landslides, stand-replacement fires, or floods) and/or by human impacts (e.g., roads, large-scale timber removal, or ground disturbance), can throw a watershed out of equilibrium. Often a watershed will recover from such disturbances with a balance of vegetation cover and stream flow. However, chronic impacts that severely impair watershed recovery can affect the long-term health of watershed resources as well as their benefits to ecosystems and human settlements.

The WCNF provides water for aquatic and riparian habitat and domestic, agricultural and recreational uses. Water is the main component of productive fisheries and riparian habitat, and wetlands. Domestic uses include drinking water for campgrounds, picnic areas, rest stops, and Forest facilities. Agricultural uses include water for crops and livestock grazing. Recreational uses include aesthetics, fishing, and boating. They also support habitat for fisheries and wildlife and contribute to aesthetic values important to many Forest users.

Climate

The major forest areas in Utah occur in the high mountains where the climate is humid and the precipitation is 22 to 40 inches annually. Generally, precipitation is the result of three types of storm systems: (1) winter storm fronts which move across the state from the west or northwest primarily from October through May; (2) cold lows which form over Nevada or southern Utah principally during October or late April and May and then drift across the state accompanied by gentle rain or snow; and (3) summer thunderstorms which develop in the summer months from the Gulf of Mexico (Wilson et al. 1975).

Strong temperature inversions occur in most valleys during the winter months. The freeze-free season ranges between 160 to 180 days on elevations near the tops of the inversions. It is 80 to 90 days in the bottoms of some of the colder valleys and less than 20 days on the tops of the higher mountains. Average wind speeds generally range between 7 and 12 miles per hour in the lower valleys but increase to 15 to 20 miles per hour on the tops of the mountains (Wilson et al. 1975).

Physiography

There are three major physiographic provinces in Utah of which the Wasatch-Cache National Forest (WCNF) is in two: the Basin and Range Province and the Middle Rocky Mountain Province. On the WCNF, the Stansbury Mountains and the Wasatch Front (Central Wasatch and Stansbury Management areas), west of the crest of the Wasatch Range from Point of the

Mountain in Salt Lake Valley to the northern end of the Wellsville Range, is within the Great Basin section of the Basin and Range Province. The Great Basin section consists of a large number of separately enclosed basins scattered throughout the region. The dominant land forms are lake terraces, bars, beaches, fans and valley plains. During the Pleistocene geologic period, many of the basins were filled by Lake Bonneville (Wilson et al. 1975).

In Utah, the Middle Rocky Mountain Province occurs in two mountain ranges: the Wasatch and the Uinta. On the WCNF (Eastern and Western Uinta Mountains, Bear, North Wasatch, and Cache Box Elder Management Areas), east of the crest of the Wasatch Front; Cache Valley; Rich County; the Bear River, Blacks Fork, and Henrys Fork drainages on the north side of the High Uinta Mountains; and the Weber and Provo River drainages on the western part of the Uinta Mountains are in the Middle Rocky Mountain Province. The western slope of the mountains is very steep and remarkably straight, but on the eastern side it is generally less steep and irregular. Generally, the range grades into dissected plateaus in the east. For a distance of about 35 miles between Salt Lake City and Provo, the range was glaciated. The longest glaciers descended westward from the mountain crests at an elevation of 11,000 to 12,000 feet from a distance of about 10 miles to an elevation of about 5,000 feet (Wilson et al. 1975).

Status of land types and soil surveys

Soil resource inventories have been prepared for most of the Forest. Approximately 90,000 acres of National Forest land are not covered by a modern soil survey. Areas not covered include the Bountiful Front of the Wasatch Mountains from North Ogden to North Salt Lake, and the Curtis Ridge area of the Ogden Ranger District. The inventories map unique combinations of landforms and soils called land-types. The WCNF has about 225 land types delineated and stored on digital soil maps in the Forest GIS system. The forest maintains an active updating program for these inventories, creating a periodic need to revise the GIS land-type layer. Recent updates on the Kamas and Logan Ranger Districts have resulted in a need to re-enter soils information from about 25 quadrangles into the corporate database. In the near future, a relational database will be available for the storage, display, and manipulation of soil chemical and physical information associated with the inventories. Future inventory updates will be directed towards populating this database with more accessible information that provides better support to land management planning activities.

Management Area Descriptions

The geology, soil, and water characteristics are described for each of the management areas. The geologic units are based on information from ecological subsections of the Forest. The soils description is a compilation of many different soil types and represents the range of soil conditions on the Forest. Information for geology, and soils is mainly from LeMoyne Wilson (1975) and DeVon Nelson (1994).

Bear Management Area

Geology - Bear River Highlands – These are gently sloping, eastward tilting uplands at elevations ranging from 5,200 to 9,500 feet. The structure is a plateau-like surface of uplifted

portions of overthrust fault zone and the lithology is Wasatch limestone, dolomite and quartzite with Cambrian rocks (Tintic quartzite, Maxfield limestone) on the west side. Geomorphic processes are fluvial and glacial; peri-glacial features are widespread.
Monte Cristo-Weber Valley Hinterlands – These are a modified ridge and valley network between the Wasatch Front and the high Wyoming Basins at an elevational range of 5,400 to 9,000 feet. The structure is graben-like and the lithology is Wasatch sandstone, limestone, conglomerates with pockets of Tertiary volcanics and Precambrian crystalline rocks. Alluvium is in the valleys and drainage ways. The geomorphic processes are fluvial and colluvial.

Soils - Soils are deep to moderately deep at elevations from 6,000 to 12,000 feet. Slopes are mostly steep to very steep with some slightly steep slopes on the alluvial fans along the foothills. The soils are moderately well to somewhat excessively drained. Permeability is slow to moderately rapid. Runoff is slow to rapid and sediment production is low to moderate. The hydrologic groups are mainly B and C.

Water - This unit is in Rich County from the Idaho border to Monte Cristo. No major rivers flow through this area but the area is the headwaters for streams flowing into the Bear River and Bear Lake. There are no large bodies of water in this unit but numerous small ponds and springs are found throughout the area. Most of the drainages have intermittent stream channels.

The main human influences that affect watershed condition are timber, livestock grazing, recreation, and roads. Timber has been harvested in many of the drainages and livestock graze throughout the area. This area was overgrazed in the late 1800s and early 1900s and poor soil productivity is found in some areas. Topsoil losses through erosion have been particularly severe in the tall forb communities, where low ground cover annuals such as tarweed have supplanted the native forbs. Undeveloped recreation use occurs along many roads and trails. There are a few main dirt roads through the area and many trails. Some of the roads and trails are located along riparian areas and contribute sediment to the streams. In general, the downward trends in topsoil losses had been reversed through a combination of allotment stocking reductions, livestock exclusion from riparian area and tarweed eradication efforts. Recent expansions in off-road and all-terrain vehicle use threaten to reverse the trend once again by creating a new cycle of accelerated erosion. Overall watershed condition trend in this unit is stable to downward.

The watershed conditions are good from Laketown Canyon to the north. The Woodruff, Big Creek, and Otter Creek drainages contain some areas with poor soil productivity and ground cover. Remnants of past beaver activity indicate much more water used to be in the drainages in the past.

Wetlands are found mostly near numerous springs and seep areas. Narrow riparian corridors are found along the main streams that drain the area. Some of the drainages have beaver that impound water behind their dams and create larger riparian areas.

There are no impaired water bodies in this unit.

Cache – Box Elder Management Area

Geology - Bear River Highlands – These are gently sloping, eastward tilting uplands at an elevational range of 5,200 to 9,500 feet. The structure is a plateau-like surface of an uplifted portion of overthrust fault zone and the lithology is Wasatch limestone, dolomite and quartzite with Cambrian rocks (Tintic quartzite, Maxfield limestone) on the west side. Geomorphic processes are fluvial and glacial; peri-glacial features are widespread.

Cache Front – These are wall-like mountain slopes and ridge systems along the east edge of Cache Valley at elevations ranging from 5,000 to 10,000 feet. The structure is an up-thrown side in a block fault and the lithology is dolomite, sandstone, limestone, mudstone, and tuffaceous sediments. Geomorphic processes are fluvial, colluvial, glacial, and peri-glacial.

Wellsville Mountains – This is a narrow ridge system forming the north end of the Wasatch Front at an elevational range of 5,000 to 9,000 feet. The structure is a fault block ridge with numerous lateral faults and the lithology is quartzite, dolomite, and limestone. The geomorphic process is fluvial and nivational on the upper east slopes.

Monte Cristo-Weber Valley Hinterlands – This is a modified ridge and valley network between the Wasatch Front and the high Wyoming Basins at elevations ranging from 5,400 to 9,000 feet. The structure is graben-like and the lithology is Wasatch sandstone, limestone, conglomerates with pockets of Tertiary volcanics and Precambrian crystalline rocks. Alluvium is in the valleys and drainage ways. The geomorphic processes are fluvial and colluvial.

Soils - Soils are deep to moderately deep at elevations from 4,300 to 12,000 feet and slopes that are rolling to very steep. On some low elevation areas, slopes are nearly level to gently sloping, but have some steep terrace escarpments. The soils are moderately well to somewhat excessively drained. Permeability is slow to rapid. Runoff is slow to rapid and sediment production is moderately to low. The hydrologic groups are mainly B and C.

Water - This unit includes the area draining into the Bear River in Cache Valley and the Wellsville Mountains. The Logan River and Blacksmith Fork flow through the Forest into the Bear River. High Creek and Summit Creek are good size creeks that flow from the Forest. A very small part of the headwaters of the Little Bear River drainage is within Forest boundaries. No large bodies of water occur, but a few small lakes, such as Tony Grove and White Pine, are found in this unit. Many small springs and seeps occur throughout the area. Almost all of the Wellsville Mountains are within the Wellsville Mountain Wilderness area and most of the watershed area from High Creek to Green Canyon is within the Mt. Naomi Wilderness area.

The Logan FERC project is located on the Logan River near the mouth of Logan Canyon. The Hyrum FERC Project is located on the Blacksmith Fork River just above the Left Hand Fork.

The main human influences that affect watershed condition are timber, livestock grazing, recreation, and roads. Timber has been harvested in Logan and Blacksmith Fork Canyons and livestock graze through much of the area. Most of the developed recreation sites are located in riparian areas along the Logan River causing bank trampling and bare soils at these sites. During

high runoff years, flooding occurs at some of the developed recreation sites. Undeveloped recreation occurs throughout the area and during hunting season many of the roads and trails become rutted from OHV use. Roads have constricted the streams in most of the main canyon bottoms.

Tony Grove Lake is listed as impaired because dissolved oxygen does not meet State water quality standards.

Central Wasatch Management Area

Geology - Central Wasatch – These are rugged ridges, scenic canyons, and high basins forming a front along the east side of the Salt Lake Valley and northern Utah Valleys at elevations ranging from 5,000 to 11,300 feet. The structure is an uplifted fault block with numerous internal faults and plutonic stock; the lithology is granite, quartzite, argilite, tillite, and limestone. The geomorphic processes are glacial, stream cutting, and mass wasting.

Soils - Most of the soils are shallow to deep soils at elevations from 5,800 to 12,000 feet and slopes that are rolling to very steep. They are moderately well to somewhat excessively drained. Permeability is slow to rapid. Runoff is slow to rapid and sediment production is moderate to low. The hydrologic groups are mainly B, C, and D.

Rock land occurs in the Wasatch Mountains in the vicinity of Alta. Areas of this land type are mainly on steep to very steep rocky colluvial areas that are above timberline, usually above 11,000 feet elevation. Rock land occupies about 70 percent of the area, and the other 30 percent is shallow to very shallow, stony soils. Because of their high elevations, these areas are important watershed. They receive large amounts of precipitation much of it as snow and these snowfields are important sources of late summer stream flows.

Water - This unit is located in the Wasatch Mountains east of Salt Lake City. Large streams drain out of Big Cottonwood, Little Cottonwood, and Mill Creek Canyons and smaller streams drain from Emigration, Red Butte, and City Creek Canyons. These canyons are important public water supply watersheds. Some small lakes are found in the headwaters areas of Big and Little Cottonwood Canyons and two public water supply reservoirs are located off-Forest in Parleys Canyon. The Mt. Olympus, Twin Peaks, and Lone Peak Wilderness areas are located between Mill Creek and Lone Peak. Large slope wetlands are found in the upper parts of Little and Big Cottonwood Canyons such as Albion Basin and Brighton.

The main human influences that affect watershed condition are recreation, homes, historic mining, hydropower, and roads. Most of the developed recreation sites are located in riparian areas in Mill Creek, Big Cottonwood and Little Cottonwood Canyons causing bank trampling and bare soils at these sites. Four ski resorts are located in Big and Little Cottonwood Canyons. Watershed conditions are affected by development along the riparian areas, ski run land terrain and vegetative changes, and snowmaking water use. With the exception of City Creek and Red Butte Canyons, many homes are located on public and private land with many of them in stream riparian corridors. Historic hard rock mining took place from the late 1800s through the early 1900s in the upper part of Big and Little Cottonwood Canyons releasing metals into surface and

groundwater. Hydropower projects in Big and Little Cottonwood Canyons have reduced the amount of water flowing below the projects. Roads in the Canyons have constricted the stream channels and contributed sediment and salts into the streams.

Two FERC projects are located in this unit, Stairs Project on Big Cottonwood Creek and the Murray/Whitmore projects on Little Cottonwood Creek. A non-FERC regulated hydroelectric facility, the Granite project, is located at the mouth of Big Cottonwood Canyon. In Little Cottonwood Canyon, a small hydropower facility is located on private land at the mouth of the Wasatch Tunnel at Snowbird.

A minimum in-stream flow is required on Little Cottonwood Creek for snowmaking water diversions at Alta and Snowbird Ski Resorts and on Big Cottonwood Creek below Brighton Ski Resort. Through the regimenting process for dams regulated by FERC, an in-stream flow of 4 cubic feet per second (cfs) in Big Cottonwood Creek is required to be released past the Stairs Gulch Plant (FERC, 1999).

Salt Lake City regulates the flows from several reservoirs in Big and Little Cottonwood Canyons. Regulated flows from storage water in Cecret Lake in Little Cottonwood Canyon and Lake Mary and Twin Lakes in Big Cottonwood Canyon provide culinary water for Salt Lake City.

Two stream segments in this unit are considered impaired by the State: Mill Creek and Little Cottonwood Creek. Mill Creek is listed because of stream sedimentation and has received funding through the Clean Water Act Section 319 funds. Little Cottonwood Creek is listed because zinc concentrations exceed State water quality standards. A multi-agency study is currently underway to evaluate the sources of metals in Little Cottonwood Creek. Mill Creek has had several stream rehabilitation projects helping to stabilize stream banks impacted by recreation use.

Historic overgrazing occurred throughout this unit until the early 1900's. Loss of vegetation and topsoil became so severe that flooding and landslides were common occurrences during the 1930's. Property damage and loss of life prompted the elimination of livestock grazing from the Wasatch front at this time, followed closely by a large program of watershed study and restoration that continued until the early 1970's. By that time, watersheds had mostly been stabilized and downward condition trends reversed. Current watershed conditions are still stable, however the potential for fire caused erosion and flooding is very high due to the almost uniform overage condition of the mountain brush communities that are common to the Wasatch Front.

Eastern Uintas Management Area

Geology - High Uintas – This is the glaciated center of the Uinta Mountains with elevations ranging from 8,000 to 13,578 feet. The structure is a broad, arculate, anticlinal fold slightly overturned to the north; the lithology is quartzite and shale of the Uintah Group with Mississippian limestone, Weber sandstone, and extensive glacial and fluvial deposits. The geomorphic processes are glacial and peri-glacial with secondary fluvial action.

North Slope Outwash – These are gently sloping benches and valleys forming the lower north slopes of the Uinta Mountains at elevations ranging from 8,000 to 10,000 feet. The structure is benches on north anticline limb and the lithology is quartzite, conglomerates with thick glacial outwash overburden extending out into the Wyoming Basin. The geomorphic process is fluvial over earlier glaciation.

Phil Pico Highlands – These are a series of hogback ridges along the north flank of the Uinta anticline with an elevational range of 6,500 to 9,000 feet. The structure is a hogback ridge and the lithology is limestone, siltstone, shale and sandstone. The geomorphic processes are colluvial and fluvial being secondary.

Soils - Most of the soils are deep to moderately deep soils, 30 to 36 inches deep, at elevations ranging from 8,000 to 11,000 feet and slopes that are rolling to very steep, mainly 15 to 65 percent. They are well to excessively drained. Permeability above bedrock is very slow to very rapid. Runoff is slow to medium and sediment production is low. The hydrologic groups are mainly B and C.

A small area of the very northeast part of the WCNF contains soils that are shallow to deep and moderately deep at elevations ranging from 6,000 to 7,000 feet. The rock outcrop is exposure of bare sandstone. These soils are well drained and permeability is moderate to slow. Runoff is medium and sediment production is moderate. The hydrologic groups are mainly D for the Lithic Argiborolls and C for the Typic Argiborolls.

Rock land is located in the High Uinta Mountains. Areas of this land type are mainly on steep to very steep, rocky, colluvial areas that are above timberline, usually 11,000 to 13,500 feet elevation. Rock land occupies about 70 percent of the area, and the other 30 percent is shallow to very shallow, stony soils. Because of their high elevations, these areas are important watershed. They receive large amounts of precipitation much of it as snow and these snowfields are important sources of late summer stream flows.

Water - This unit is located on the north slope of the Uinta Mountains. The main rivers that drain this unit are the Blacks Fork, Smiths Fork, Henrys Fork, and Beaver Creek. Many small lakes and ponds and three large reservoirs, Meeks Cabin, Beaver Meadow, and Hoop Lake, are found in this unit. Many large riparian areas and wetlands are located along most of the main rivers and tributaries and around the small lakes and ponds. A few irrigation diversions are located near the Forest boundary.

The main human influences affecting watershed condition are timber, livestock grazing, irrigation, recreation, and roads. Timber harvest has occurred and livestock graze most of the area. Historic overgrazing created conditions of accelerated erosion and gully formation, most noticeable in the large wetland meadows and riparian parks that are common in both the Eastern and Western Uinta Mountains. One of the main watershed concerns is the sheep driveway that has erosion problems occurring over many years. Extensive restoration efforts have almost completely reversed the historic downward trends in watershed condition, to the point where most gully complexes are revegetated and healed over. Some segments of streams are dewatered from irrigation diversions. Some developed recreation sites are located along riparian areas of

the main rivers. Some of the roads contribute sediment to the stream because of poor road drainage features.

Altered flow regimes occur on the Smiths Fork River below State Line Dam, the Blacks Fork River below Meeks Cabin Reservoir, Beaver Creek below Hoop Lake, and Lost Creek below Beaver Meadows Reservoir.

Smiths Fork in Wyoming on the north slope of the Uinta Mountains is listed by the State of Wyoming as impaired for habitat degradation and an evaluation of stream conditions is planned.

Bridger Lake, China Reservoir, Lyman Lake, and Marsh Lake do not meet State of Utah water quality standards for dissolved oxygen.

North Wasatch – Ogden Valley Management Area

Geology - Monte Cristo-Weber Valley Hinterlands – This is a modified ridge and valley network between the Wasatch Front and the high Wyoming Basins at an elevational range of 5,400 to 9,000 feet. The structure is graben-like and the lithology is Wasatch sandstone, limestone, conglomerates with pockets of Tertiary volcanics and Precambrian crystalline rocks. Alluvium is in the valleys and drainage ways. The geomorphic processes are fluvial and colluvial.

Northern Wasatch – This is a bold, straight mountain front crossed by large east-west canyons at elevations ranging from 5,000 to 9,700 feet. The structure is an uplifted fault block; the lithology is mostly Farmington Canyon crystalline rocks, gneiss, quartzite, and dolomite. The geomorphic processes are fluvial, glacial, and colluvial.

Wellsville Mountains – This is a narrow ridge system forming the north end of the Wasatch Front at an elevational range of 5,000 to 9,000 feet. The structure is a fault block ridge with numerous lateral faults and the lithology is quartzite, dolomite, and limestone. The geomorphic process is fluvial and nivational on the upper east slopes.

Soils - These are deep to moderately deep soils at elevations ranging from 5,200 to 10,000 feet on slopes that are steep to very steep with some that are gently rolling. The soils are moderately well to somewhat excessively drained. Permeability is moderately slow to rapid. Runoff is slow to rapid and sediment production is low to moderate. The hydrologic groups are mainly B and C with some D.

Water - This unit is located from Brigham City to Bountiful to the Monte Cristo area. Two main rivers, the Weber and Ogden Rivers, drain large areas of this unit. Along the Wasatch Front, most of the drainages have small intermittent streams. However, when there is high winter precipitation, large debris flows have come out of many of the drainages during spring runoff. This part of the Wasatch Front is considered a high hazard area because of high debris flow potential. This unit has a few small lakes and ponds but for the most part is fairly dry. Pineview Reservoir is a large body of water located near Huntsville used extensively for water-based recreation. Riparian areas and wetlands occur mainly along the South Fork Ogden River. A large wetland meadow is located on Wheeler Creek near the Snowbasin Ski Resort.

The main human influences affecting watershed condition are livestock grazing, recreation, and roads. Livestock graze in the drainages above Causey Reservoir. Most of the developed recreation sites are located in riparian areas along the South Fork Ogden River causing some bank trampling and bare soils. ATV use has had a sharp increase in the last few years and many small two-track trails are found near Willard Peak, along the foothills and top of the Wasatch Front range.

FERC projects are located at Pineview Dam on the Ogden River and Causey Dam on the South Fork Ogden River. A minimum stream flow has been set for Wheeler Creek as part of the Phase I planning for the Snowbasin Ski Resort development and a flow monitoring study is currently being conducted to provide better water flow information near the resort. The Ogden River Water Users Association maintains an in-stream flow of at least 10 cfs in the Ogden River below the Pineview Dam during normal water years, but flows may be reduced if water rights in the basin are shorted (FERC, 2000).

Pineview Reservoir does not meet State water quality standards for Total Phosphorus and dissolved oxygen and is listed as high for conducting a TMDL.

Stansbury Management Area

Geology – Stansbury Range - This is a fault block mountain range in the eastern Great Basin at elevations ranging from 5,500 to 11,100 feet. The structure is a tilted block with western dip slopes and eastern scarp face and the lithology is mostly Prospect Mountain quartzite and rocks (limestone, dolomite, and shale) of the Oquirrh Group. The geomorphic processes are fluvial, glacial, and nivational.

Soils - Soils are deep to moderately deep at elevations from 6,000 to 12,000 feet. Slopes are mostly steep to very steep with some slightly steep slopes on the alluvial fans along the foothills. The soils in this association are moderately well to somewhat excessively drained. Permeability is moderately rapid to slow. Runoff is slow to rapid and sediment production is moderate. The hydrologic groups are mainly B and C.

Water - This unit is a mountain range in the Great Basin west of Tooele, Utah. There are no large rivers flowing in this area and the largest streams are about 10 to 20 feet wide. There are no large bodies of water in the area, although Grantsville Reservoir is located in the Willow Creek drainage off the Forest. The Deseret Peak Wilderness occupies a large area in the center of the unit.

Gradual shifts over the last century towards a drier and warmer climate have resulted in degraded watershed conditions. The climatic changes have enhanced the ability of poor ground cover species such as cheat grass and pinyon/juniper to invade the sagebrush grass communities common to this area. Increased runoff and soil erosion have been a product of these invasions. Past attempts at eradicating cheat grass and at slowing pinyon/juniper encroachment have been successful in restoring favorable soil hydrologic conditions in isolated areas. Overall, these efforts have had little effect on reversing downward watershed condition trends in this unit.

Along with the North and Central Wasatch Management areas, this area has experienced the most active wildfire history on the WCNF. Past wildfires have burned at high intensities, creating an acute need for post fire rehabilitation. Monitoring has shown these efforts to be generally successful in restoring proper watershed function and protecting long-term soil productivity.

The main human influences affecting the watershed are livestock grazing, recreation use, and mining. A few water diversions are located near the Forest boundary.

Wetlands are found mostly near numerous springs and seep areas. Several of the springs are fenced to protect from livestock damage. The riparian areas are found along the main streams that drain the area. Riparian areas that are located by campsites and picnic areas in North and South Willow Canyons have bare stream banks and vegetation trampling.

There are no impaired water bodies in this unit.

Western Uintas Management Area

Geology - West Flank Uintas – These are ridges, valleys, and benches forming the west end of the Uinta Mountains at elevations ranging from 7,000 to 12,000 feet. The structure is an anticline with exposed curve; the lithology is Uinta quartzite and glacial deposits in the center, and limestone and Weber sandstone mostly on the sides. The geomorphic processes are glacial, peri-glacial, stream cutting, and mass wasting.

High Uintas – This is the glaciated center of the Uinta Mountains with elevations ranging from 8,000 to 13,578 feet. The structure is a broad, arculate, anticlinal fold slightly overturned to the north and the lithology is quartzite and shale of the Uintah Group with Mississippian limestone, Weber sandstone, and extensive glacial and fluvial deposits. The geomorphic processes are glacial and peri-glacial with secondary fluvial action.

North Slope Outwash – These are gently sloping benches and valleys forming the lower north slopes of the Uinta Mountains at an elevational range of 8,000 to 10,000 feet. The structure are benches on north anticline limb and the lithology is quartzite, conglomerates with thick glacial outwash overburden extending out into the Wyoming Basin. The geomorphic process is fluvial over earlier glaciation.

Soils - Most of the soils are deep to moderately deep, 30 to 36 inches deep, at elevations of 8,000 to 11,000 feet and slopes that are rolling to very steep, mainly 15 to 65 percent. The soils are well to excessively drained. Permeability above bedrock is very slow to very rapid. Runoff is slow to medium and sediment production is low. The hydrologic groups are mainly B and C.

Soils in the lower elevations of the Weber River and Beaver Creek drainages are deep to moderately deep at elevations from 5,200 to 8,000 feet on slopes that are steep to very steep but with gently rolling included. The soils are well to somewhat excessively drained. Permeability

is slow to moderately rapid. Runoff is medium and sediment production is low. The hydrologic groups are mainly B and C.

Rock land is located in the High Uinta Mountains. Areas of this land type are mainly on steep to very steep, rocky, colluvial areas that are above timberline, usually 11,000 to 13,500 feet elevation. Rock land occupies about 70 percent of the area, and the other 30 percent is shallow to very shallow, stony soils. Because of their high elevations, these areas are important watershed. They receive large amounts of precipitation, much of it as snow; these snowfields are important sources of late summer stream flows.

Water - This unit is located in the drainages east of Kamas including the Bear River drainage. The headwaters of the Weber, Provo, Duchesne, and Bear Rivers are located in this unit. These large rivers provide drinking and irrigation water to many users. Many small lakes and reservoirs are located in this unit. Large reservoirs in the area include Washington Lake, Trial Lake, Smith and Morehouse, and Whitney Reservoirs. Large areas of wetlands and riparian area are found in the High Lakes Country and along the Weber, Provo, and Duchesne Rivers. Part of the High Uintas Wilderness is located in this unit.

The high lakes area of the Kamas Ranger District has many of the reservoirs on the Forest. Notch, Ibantec, Fish Lake, Sand, Castle Lake, Kamas Lake, and Abes Lake are active reservoirs operated by irrigation water users under special use permit. Washington Lake, Trial Lake, and Lost Lake are reservoirs operated by the Central Utah Water Conservancy District and are withdrawn under the jurisdiction of the Bureau of Reclamation. Since 1994, 12 reservoirs were stabilized as part of the Central Utah Project mitigation project to reduce the hazard of the dams to a low or no hazard. The reservoirs are Star (1994), Crystal (1995), Long (1995), Duck (1996), Lilly (1996), Fine (1997), Island (1997), Pot (1997), Marjory (1997), Weir (1997-98), Big Elk (1998), Wall Lake (1999).

The main human influences that affect watershed condition are timber, livestock grazing, recreation, irrigation, and roads. Timber harvest has occurred and livestock currently graze in all of the main drainages. This area was overgrazed in the late 1800s and early 1900s and poor soil productivity is found in some areas. Topsoil losses through erosion have been particularly severe in the tall forb and aspen communities, where low ground cover annuals such as tarweed and coneflower have supplanted the native forbs. Expansions in off-road and all-terrain vehicle (OHV/ATV) use in the 1980's contributed to the general downward trend in watershed condition. In general, the downward trends in topsoil losses had been reversed through a combination of allotment stocking reductions, livestock exclusion from riparian area and tarweed eradication efforts, and confinement of OHV/ATV use to a system of designated trails. Overall watershed condition trend in this unit is stable.

Most developed recreation sites are located along riparian areas of the Weber, Provo, and Bear Rivers. Many watershed improvement projects that protect riparian areas and stream banks have been done along the Mirror Lake corridor. Irrigation diversions withdraw water and augment water flows in several basins. Some roads and trails contribute sediment to streams particularly during the fall hunting season.

A diversion is located on the Duchesne River East Portal of the Duchesne Tunnel. Water flows from the East Portal through the Duchesne Tunnel to the upper Provo River above Soapstone Campground.

The City of Oakley has petitioned the Environmental Protection Agency for Sole Source Aquifer Designation for the aquifer located in the Weber Canyon area east of Oakley.

Mirror Lake does not meet State water quality standards for dissolved oxygen.

Geologic Hazards

The main geologic hazards that affect the WCNF are earthquakes and landsides. For the most part, the earthquake hazard is low to very low. Landslides are very common geologic hazards in Utah and many have occurred on the WCNF. Utah is among eight states with a landslide hazard of "severe," the highest hazard class. Conditions favorable to landslides exist primarily in mountain ranges and along the edges of high plateaus. However, shallow landslides on steep mountain slopes generate debris flows causing damage and loss of life in urban areas at canyon mouths far removed from the source of the slope failure. In northern Utah's Davis County residential areas on alluvial fans were especially hard hit by debris flows in the 1920s, 1930s, and 1980s (Harty 1991).

Landslides in Utah are most common in the Middle Rocky Mountain Province, and in the High Plateau Province. These regions contain a high density of steep slopes and the highest average annual precipitation in Utah (Harty 1991).

Geologic formations on the WCNF commonly involved in landslides are the Lake Bonneville Formation, the Farmington Canyon Complex, and the Ankkarah Formation. The Farmington Canyon Complex and the Ankarah Formation are two of five formations producing most of the shallow landslides within Utah. The Bonneville Formation is located along the west flank of the Wasatch Range (Salt Lake, Weber, Davis Counties) and between the Wasatch Range and the Great Salt Lake (Weber and Davis Counties). The Farmington Canyon Formation is located on the west flank of the Wasatch Range between Bountiful (Davis County) and Willard (Box Elder County). The Ankarah Formation is located in the Wasatch Range east of Salt Lake City between Mill Creek and Parleys Canyon (Salt Lake County) (Harty 1991).

Almost all of the historic landslides occurring on the WCNF are located along the west face of the Wasatch Front from Pleasant View to Draper. While most are small, shallow slides less than 2000 feet long, several large, shallow slides occurred in the canyons from Bountiful to Kaysville and from Weber Canyon to Ogden Canyon. Several large deep-seated prehistoric slides were identified in the Blacks Fork and Smiths Fork drainages on the North Slope of the Uinta Mountains and in the Wasatch Range east of Willard. Most of the small deep-seated prehistoric slides less than 2000 feet long are located along the foot of the mountains of the east side Cache Valley and the west side of the Wasatch Range (Harty 1991).

Most communities in Utah experience severe rainstorms causing flooding and landslide damage, such as in Davis County during the 1920s and 1930s. However, landslides resulting from rapid

snowmelt are more geographically widespread than rainstorm-related landslides. During the record-breaking years between 1982-1984, the resulting damage from flooding and landslides was so extensive that 22 out of 29 counties were declared eligible for national disaster assistance. In 1983, a debris flow from Rudd Canyon in Davis County deposited 80,000-90,000 cubic yards of debris throughout a 9-block square residential area in Farmington, resulting in damage to 35 houses (Harty 1991).

All mapped landslides should be considered hazard areas. The distribution of the most recent (historical) landslides can be used as a guide to landslide susceptibility in that it shows areas that may continue producing landslides under current climatic conditions. However, many of Utah's largest and most destructive landslides were reactivations of prehistoric landslides. The hazard potential of "older" landslides should not be underestimated but investigated in further detail when development is considered (Harty 1991).

Surface Water

The WCNF is within 15 fourth-order watersheds, 28 fifth-order watersheds, and 119 sixth-order watersheds. The WCNF straddles the Colorado River Basin and the Great Basin watersheds. The Henrys Fork, Smiths Fork, Blacks Fork, Muddy Creek, and upper Duchesne River watersheds drain into the Colorado River Basin. The upper Bear River, Weber River, Ogden River, Provo River, and Jordan River drain into the Great Basin watershed.

The WCNF contains more than 1178 miles of perennial streams and numerous natural springs and seeps. Many small natural lakes and reservoirs supplying water for wildlife, grazing animals, recreation sports fisheries, and irrigation are found in the Uinta Mountains. Several of the natural lakes in the system have been dammed and converted to reservoirs.

The conversion of aspen to conifer due to fire suppression during the 1900s has increased the amount of water that is transpired and has reduced the amount of water available for stream flow and other vegetation. On the WCNF, it is estimated that there is about a 60 percent reduction in the amount of aspen communities from historic levels.

Groundwater

Forest snowmelt recharges ground-water aquifers. Recharge to deep, confined aquifers occurs almost exclusively near or at mountain fronts. Streams originating on the Forest contribute to the recharge of aquifers within and outside the Forest boundary.

In general, groundwater quality on the WCNF is good to excellent. Groundwater wells are used for domestic purposes at campgrounds and administrative sites. And, groundwater from springs is used for domestic livestock and wildlife. Typical forest management activities have limited impact on groundwater. Activities that pose the greatest risk to groundwater quality are hard rock mining and oil and gas development. In the late 1800's, hard-rock mining in Big and Little Cottonwood Canyons exposed mineral bearing ore in underground shafts and adits causing increased metals concentrations in groundwater. As a result, the groundwater flows to the surface into Little Cottonwood Creek causing zinc concentrations to exceed state standards for

aquatic life. No problems are known to have occurred to the groundwater from oil and gas development occurring along the north slope of the Uinta Mountains on the Evanston/Mountain View Ranger District.

Wetlands, Riparian Areas, and Floodplains

Wetland and riparian areas occupy a small amount of the lands managed by the WCNF. Most of the wetlands occur on the north slope of the Uinta Mountains. Composed of sedges and willows, they are found in broad meadows, potholes and wide floodplain areas along the major river bottoms. Other areas having large wetlands include the Beaver River near Kamas, the Provo River, and Wheeler Creek. Large slope wetlands are located in Big and Little Cottonwood Canyons. The remainder of the Forest has small or narrow wetlands associated with streams flowing through narrow valley bottoms along the Wasatch Front and in the Logan/Ogden areas. Wetlands are key to productive fisheries and wildlife habitat, attenuated flooding, quality water for downstream users, continuous ground water recharge, diverse scenery, recreation sites, and sustaining timber and forage production.

Riparian ecosystems constitute the transitional area between the aquatic ecosystem and the adjacent terrestrial system. The aquatic ecosystem includes the streams, ponds, lakes, and the biotic communities and habitat found in these features. Wetlands are found on land that is inundated by surface or groundwater with a frequency sufficient to support vegetation or aquatic life that requires saturated or seasonally saturated soil conditions. Wetlands generally include marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds.
Floodplains are relatively flat areas adjoining a river way that are prone to flooding. Statistically, these areas are subject to a 1 percent (100-year recurrence) or greater change of flooding in any given year. Floodplains occupied by healthy vegetation communities reduce the severity of floods by allowing water to spread out over the floodplain. Vegetation slows the speed of the water and allows sediment to settle out and water to infiltrate. Water is slowly released from alluvial aquifers back to the channel during drier periods of the water.

Large floodplains occur along the main rivers including Beaver Creek near Lonetree, Henrys Fork, Smiths Fork, Blacks Fork, Bear River, Provo River, Beaver Creek near Kamas, Ogden River, the Blacksmith Fork, and the Logan River. These floodplains are up to several hundred feet wide and may have several channels. Most of the streams on the Forest have small floodplains adjacent to the channel.

Water Uses

Water uses on the Forest include livestock stock water, irrigation-diversion flows, irrigation-augmentation flows, Federal Energy Regulatory Commission (FERC) hydropower projects, recreation uses, and road maintenance. Livestock water use is very small compared to the water yield of the Forest. Most water diversions are near the Forest boundary and are used to irrigate land outside the Forest boundary. Road maintenance water use is a temporary use for dust abatement. Culinary water is used in campgrounds, picnic areas, and Forest administrative sites.

Five hydropower projects regulated by FERC are located on the Forest. In 1995, relicensing was initiated on the Stairs Project in Big Cottonwood Canyon and the Pioneer Project at Pineview Reservoir. As a result, minimum instream flow requirements below the Stairs project for the protection of fisheries and aesthetics and mitigation on the tailrace section (off-Forest) of the Pioneer Project to provide water for fisheries and to enhance aquatic habitat conditions are now in place.

Many reservoirs have been constructed on the WCNF. Large reservoirs, more than 1000 acre-feet of volume, are Pineview, Causey, Meeks Cabin, Beaver Meadow, Whitney, Hoop Lake, Washington Lake, Trial Lake, and Smith and Morehouse. These reservoirs store more than 176,000 acre-feet of water and have a surface area greater than 4,500 areas. Many small reservoirs are located throughout the Forest.

Public Supply Watersheds

A public supply watershed is defined as the portion of a river basin consisting of lands that contribute surface water, groundwater, or both, to a public water system as defined in the Safe Drinking Water Act, as amended. There are several key public supply watersheds whose source partially or almost entirely drains from the WCNF.

The main watersheds supplying water for public consumption are the Provo River, Weber River, Big Cottonwood Creek, Ogden River, and the Logan River. Almost 60 percent of the watersheds draining from the Forest provide water for public drinking water needs. Many of the watersheds supply drinking water from springs and well developments. These watersheds are located in major population areas such as Salt Lake City, Ogden, and Logan that are currently experiencing a steady increase in population growth.

As an example of the importance of Forest water supplies, currently within the Jordan River Basin (primarily Salt Lake County), only 26 percent of presently developed water supply for municipal, industrial, irrigation, domestic and stock-watering purposes is from ground water sources (Utah, State of 1997b). The remaining 74 percent is from surface water sources of which most originate from the mountains draining into the Jordan River Basin. The protection of the large amount of drinking water sources that originate on the WCNF is very important to the adjacent communities.

Public supply water is used on the Forest for campgrounds, picnic areas, and administrative sites. Public supply water used at these sites are transient water sources that are used less than 6 months out of the year supplying a small amount of water, for example providing water needs for 2 to 68 units per campground.

Sewer lines are installed in Big and Little Cottonwood Canyons to protect the public health. The Little Cottonwood Canyon sewer line was installed in the early 1970’s and the Big Cottonwood Canyon sewer line was installed in the early 1990’s. These lines have worked well although some temporary blockages with spilled sewage have occurred.

The City of Oakley has petitioned the Environmental Protection Agency for Sole Source Aquifer Designation to acknowledge that Cottonwood Springs and the recently installed Humbug Well are the only water sources available to the community and to raise awareness about the importance of keeping the aquifer free of contamination (Jarvis, T. 1999). The aquifer is located along the south side of Weber Canyon east of Oakley and is the only Sole Source Aquifer petitioned on the WCNF.

Instream Flows and Water Rights

Irrigation diversions and hydropower storage or diversions have reduced the flow of several streams on the Forest. Most of these streams are at or near the Forest boundary. De-watered stream conditions occur mostly off the Forest.

The Forest does not have instream flow water right claims recognized by the State of Utah. However, minimum instream flow requirements are set through special use authorization for a few streams.

Water Quality

Overall, water quality is good. Active and inactive mining sites have contributed to degradation of water quality in several streams within the Forest. Other impacts to water quality are associated with natural debris flows, roads, water diversions and augmentation, livestock grazing, and recreation activities.

The State of Utah has designated the waters above the Forest boundary as Antidegradation Segments indicating that the existing water quality is better than the established standards for the designated beneficial uses. Water quality is required by state regulation to be maintained at this level. The beneficial uses of streams within the Forest, as designated by the Utah Department of Minimum instream flow requirements are set through special use authorization for a few streams. Environmental Quality, Division of Water Quality, are Class 2B – protected for recreation; Class 3A – protected for cold water species of game fish and other cold water aquatic species; and Class 4 – protected for agricultural uses. Also, the beneficial use of streams draining into the Logan River watershed include Class 3D – protected for waterfowl, shore birds and other water-related wildlife, and necessary aquatic organisms in their food chain. The numeric water quality standards are in Section R317-2, Utah Administrative Code, Standards of Quality of Waters of the State (Utah, State of 2000a).

Water bodies are assessed by the states of Utah and Wyoming to determine if the water bodies are meeting water quality standards. Most water bodies on the WCNF are fully supporting their beneficial uses. In Utah, two streams and seven lakes or reservoirs are listed as impaired on the WCNF (Utah, State of. 2002a). In the State of Wyoming, the East and West forks of the Smiths Fork to the Utah Wyoming boundary, and Willow Creek to the Utah Wyoming boundary is listed as impaired based on a 319 Watershed Improvement project on the Smiths Fork (Wyoming, State of 2002).

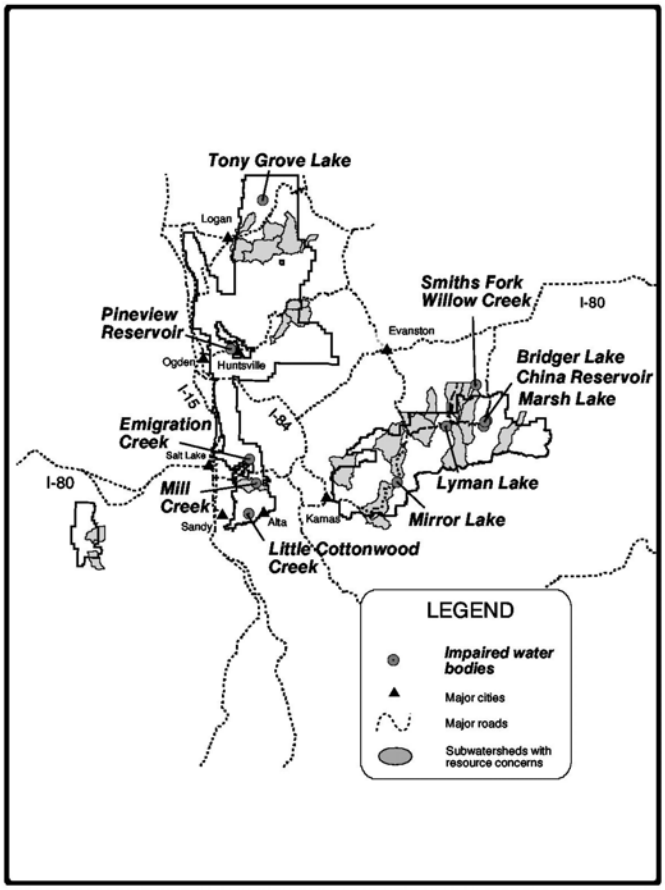
Table GEO-1. Streams, Rivers, Lakes, and Reservoirs on the Wasatch-Cache National Forest that are on Utah's and Wyoming's 2002 303(d) List.

Waterbody	HUC	Pollutant or Stressor
East Fork Smiths Fork (in Wyoming)	*14040107*	*Habitat degradation*
West Fork Smiths Fork (in Wyoming)	*14040107*	*Habitat degradation*
Willow Creek (in Wyoming)	*14040107*	*Habitat degradation*
Bridger Lake	14040107	Dissolved oxygen
China Reservoir	14040107	Dissolved oxygen
Marsh Lake	14040107	Dissolved oxygen
Lyman Lake	14040107	Dissolved oxygen
Mirror Lake	14060003	Dissolved oxygen
Tony Grove Lake	16010203	Dissolved oxygen, *total phosphorus*
Pine View Reservoir	16020102	Dissolved oxygen, *total phosphorus*
Emigration Creek	*16020204*	*Fecal coliform*
Mill Creek	16020204	Sediment, habitat alteration
Little Cottonwood Creek	16020204	Zinc

Every two years, the Utah Department of Environmental Quality submits a list of waters in a report to the US Environmental Protection Agency (USEPA) containing those water bodies in Utah that are considered impaired and not meeting its beneficial uses. In April 2002, Utah submitted its 2002 303(d) list to the USEPA for review and approval. On the WCNF, water bodies that are listed on the Utah's 2002 303(d) list are shown in Table WA-1. Several water bodies on the WCNF have been requested for removal from the 2000 303(d) list. From table WA-1, Emigration Creek for Fecal coliform, and Tony Grove for total phosphorus are new additions within the WCNF on the April 2002 list. Mill Creek is on the list of water bodies to be removed from Utah's 2000 303(d) list of impaired water bodies for fecal coliform, sediment, and habitat modification. For the last several years, stream bank improvement projects have been implemented in Mill Creek in order to reduce sedimentation of Mill Creek and to improve streamside habitat.

The State of Utah has submitted several lake and reservoir waterbodies and specific parameters for removal from Utah's 2000 303(d) list. If approved, Pineview Reservoir will be removed from the list for dissolved phosphorus and dissolved oxygen because a TMDL is submitted, and for temperature because of a beneficial use classification change. If approved, China Reservoir will be removed from Utah's 2000 303(d) list because more information is needed to determine if this reservoir should be listed.

Figure GEO-1. Locations of Impaired Water Bodies and Watersheds in need of Restoration



The WCNF is working with the State of Utah to determine the causes of *water quality* impairment. The WCNF has been working with the Little Cottonwood Group since 1998 assessing the effects of mining on Little Cottonwood Creek. Field data on water quality, stream morphology, and aquatic health has been collected and a Total Maximum Daily Load (TMDL) assessment is being reviewed by the USEPA. In the Smiths Fork drainage, water quality samples are being collected and stream condition surveys have been completed for the purpose of assessing the quality of water on Forest Service land.

As part of a cooperative monitoring program with the State of Utah, the Forest Service collects water samples in selected drainages and sends them for analysis. Other water quality monitoring activities include macro-invertebrate sampling on selected streams to determine aquatic biological health and stream stability surveys. In addition to this, several cooperative efforts concerned with water quality are ongoing between the WCNF, state and local governments, regional planning agencies, and state colleges and universities.

Since 1985, the WCNF has completed R1/R4 level II riparian surveys on 54 streams, stream stability surveys on 14 streams, chemical water quality monitoring on 34 streams, and macroinvertebrate sampling on 7 streams. This data indicates that several areas of the Forest are in need of improvement in channel stability, vegetative density and structure, and riparian conditions.

Watershed Condition Assessment

Under the Inland West Watershed Initiative, a course filter assessment at the watershed scale was conducted on the sixth-code watersheds of the WCNF to identify the probable condition of watersheds, identify locations of critical water-dependent resource values at risk needing priority protection, and to identify locations of damaged soil, riparian, and aquatic resource values needing to be restored. The assessment was qualitative and relied on the knowledge of resource specialists and on-the-ground personnel.

The assessment was used to classify the watersheds according to condition classes (FSM 2521). Briefly, Class I watersheds are described as providing a robust basis for sustained production of goods and services with no long-term changes occurring even when major storms occur. Class II watersheds are those not attaining the requirements for Class I but not requiring capital investments to restore watershed conditions. These watersheds can be restored through integrated, ecological approach to management. Class III watersheds require technological and economically feasible capital investment to restore watershed conditions to a level consistent with management goals. At the sixth code watershed scale, the assessment shows four Class I watersheds, 91 Class II watersheds, and 24 Class III watersheds.

Watersheds that are highest priority for watershed improvement are those that have water quality impairment, those that have the greatest threat to riparian health and aquatic habitat conditions, and/or those that have partnership opportunities to accomplish work. Priority watersheds needing restoration are listed in Table WA-2. These watersheds have one or more resource concerns such as poor riparian and stream conditions, potential for large wildfires, lack of woody debris, channel scour from tie hacking, lack of aspen and beaver habitat. Poor riparian and stream conditions are those that have conditions such as high streambank instability, areas with a lot of trampling within riparian areas, or low vegetative cover.

Future trends

Water supply will become a more critical issue as population increases in the communities adjacent to the Forest. Water rights held by the Forest Service will become important in meeting management goals such as maintaining adequate stream flows for healthy riparian areas and developing recreation sites. As snowmaking increases at ski resorts, water withdrawals during critical base flow periods will require alternative methods of diversion to ensure that ecosystems and fisheries are maintained downstream.
In Big and Little Cottonwood Canyons, water quality will continue to be a concern as runoff from mining sites carries toxic pollutants downstream. Sediment sources such as roads and diversion ditches will continue to require regular maintenance to ensure that water quality is not adversely affected. OHV/ATV use will increase dramatically on the forest and will result in watershed damage where it is not managed and confined to suitable areas and designated trails. Oil and gas development, with its potential for affecting surface and ground water, will require inspections to protect these resources.

Table GEO-2. Wasatch-Cache National Forest High Priority Watersheds Needing Restoration

Fifth Code Watershed	Subwatersheds with Resource Concerns	Resource Concerns
1404010606	West Fork Beaver Creek	Fire exclusion, potential for large fires, lack of woody debris
1404010706	West Smiths Fork headwaters	Channel scour form tie hacking
1404010706	Willow Creek	Lack of aspen resulting in lack of quality riparian and beaver habitat
1404010707	East Fork Blacks Fork area	Erosion on sheep driveway and channel scour from tie hacking, poor beaver habitat from fire exclusion and livestock.
1404010707	Lower Blacks Fork River area	Gully system and poor riparian conditions from grazing
1404010803	West Fork Muddy Creek	Riparian impacts from grazing
1601010101	Hayden Fork	Channel scour from tie hacking, roads near stream in Gold Hill area
1601010101	West Fork Bear River	Extensive off road vehicle trails, poor soil productivity
1601010102	Mill Creek area (Bear River drainage)	Channel scour from tie hacking, roads near stream
1601010105	Upper Woodruff Creek (Wheeler Ck)	Poor soil productivity and ground cover, poor stream stability, lack of beaver habitat
1601010105	Sugar Pine Canyon	Poor soil productivity and ground cover, poor stream stability, lack of beaver habitat
1601020101	Laketown Canyon	Poor soil productivity and ground cover, poor stream stability, lack of beaver habitat
1601020301	Right Hand Fork Logan Canyon	Poor riparian conditions from roads
1601020302	North Logan area	Poor riparian conditions from roads and water pipeline in Green Canyon bottom
1601020303	Saddle Creek	Poor riparian conditions from roads and grazing
1601020303	Left Hand Fork Blacksmith Fork	Poor riparian conditions from roads and grazing
1601020303	Providence/Millville area	Poor riparian conditions from roads, gravel quarry, and heavy ATV and 4X4 use
1601020304	South Fork Little Bear River	Poor ground cover conditions from roads, and heavy ATV and 4X4 use
1601020405	Box Elder Creek	Poor riparian and upland conditions from roads, grazing, and OHV use
1602010101	Swifts Canyon to Stillman Creek area	Poor riparian conditions from roads, grazing, and OHV use
1602010206	North drainages of Causey Reservoir (Wheatgrass Ck)	Poor riparian conditions from roads, grazing, and OHV use
1602020301	Upper Provo/Soapstone area	Poor stream stability below Duchesne Tunnel from water augmentation.
1602020401	Mill Creek (SLC front)	Poor riparian conditions from use in developed recreation sites.
1602030403	East Hickman Canyon	Poor upland conditions from OHV use
1602030404	East Stansbury Mountains area	Poor upland conditions from OHV use and poor riparian conditions near dev rec sites

Environmental Consequences

General Effects

Management activities affecting watershed processes are described in terms of their potential to increase erosion and sediment yields, their ability to alter the physical, chemical, or biological properties of both soil and water, or by their influence on the timing or magnitude of surface water runoff. Management activities may directly or indirectly impact riparian and wetland habitats, resulting in impacts to channel stability, water quality, and aquatic habitat quality. Impacts to stream channels, floodplains and wetlands may also lead to increased flooding downstream by reducing the capacity of floodplains to store floodwaters and increasing the rate of watershed runoff. Most of the management activities on the WCNF have the potential to impact water quality and quantity. Some of these activities have the potential to increase the magnitude of the relatively small but frequently occurring floods to which natural stream channels are adapted and which control the form and dimension of the channel (Wolman et al. 1960, Andrews 1980). Activities that influence the rate of watershed runoff and the resulting magnitude of individual flood peaks can have long-term impacts on channel stability leading to increased bank erosion, channel degradation, and sedimentation in alluvial channels. Individual activities generally do not, by themselves, result in this kind of change, depending on their severity, but the impacts of multiple management activities over long time periods can. This is very important in central and northern Utah where large floods occur periodically that are much greater in magnitude than the average of floods in all other years. In northern Utah, the recurrence interval of large floods has been approximately 30 years. Such floods can cause significant damage and channel change in streams previously impacted by land management activities and potentially result in changes in riparian habitat, increased erosion and loss of aquatic habitats.

Many activities on the forest result in mechanical ground disturbance that reduces vegetative ground cover and exposes soils to wind and water erosion. Where activities involve heavy equipment, compaction and rutting of soils can occur. The short-term effect of these changes is to cause increases in runoff and sediment delivery to surface waters. Where these effects are prolonged in duration, a degradation of long-term soil productivity will occur. Fine sediments are the primary agent responsible for reduced water quality in forested watersheds. Fine sediments reduce water clarity and increase turbidity. Sediments reduce the quality of aquatic habitat by filling gravel interstices, affecting fish as well as aquatic insects and other life. Increased fine sediment loads result in reduced water and oxygen flow in spawning gravels that, in turn, result in reduced spawning success in cold-water fish.

Many management strategies can, at least partially, alleviate these adverse effects. Providing adequate road maintenance, improving road drainage, and removing or re-aligning damaging road segments can greatly reduce the adverse impacts of roads. Changes in grazing management strategies, such as those developed over the last 20 to 30 years, allowing for retention of ground vegetation and protection of riparian areas can also result in improved stream channel and aquatic habitat conditions. Streamside buffer zones protect channel stability and water quality by maintaining the integrity and function of riparian and wetland areas. Minimizing ground disturbance in riparian areas and on hill slopes protects soils from erosion, avoids compaction,

preserves soil organic matter, all of which help reduce excess erosion and runoff. Dispersing activities such as timber harvest over time and space can allow natural recovery processes to take place.

Issues

There are three issues tracked through effects analysis on soil and water resources. They are, soil productivity, water quality, and water yield. There are eight principle categories of management activities generally having the potential to affect one or more of the three issues. Of the eight categories discussed below, most have no potential to affect water yield. Only one, "Timber Harvest/Vegetation Management" discusses this issue. All eight have the potential to affect soil productivity and water quality, and those issues are discussed throughout. No impacts to geologic resources have been identified from activities expected to take place on the WCNF in the next planning period.

Effects on Soil and Water Resources from Roads and Access Management

Roads represent a total commitment of the ability of the soil resource to support vegetation communities. In the absence of extensive restoration efforts, even temporary roads or timber harvest skid trails will result in a loss of long-term soil productivity. System roads create an irretrievable loss of the soil resource, while temporary and non-system roads can cause a similar loss if not closed and restored to productive condition.

Roads modify natural drainage networks and accelerate erosion processes resulting in increased stream sedimentation, degraded aquatic habitats and altered channel morphology. Road impacts increase as they become more hydrologically connected to the natural channel network (Jones et al. 1996). Roads and their drainage systems typically act to intercept surface and subsurface runoff and route excess runoff into the channel system (Hauge et al. 1979, Megahan 1972), resulting in both increased stream flows (Harr et al. 1975) and increased sediment delivery to streams (Wemple et al. 1996). Especially in steep terrain, roads increase the rate of hill slope failures and soil mass wasting (Swanston et. al. 1976, Swanston 1991). Fine sediments can be delivered to natural streams by erosion of road surfaces as well as from non-vegetated road cut and fill surfaces (Reid et al. 1984). Roads impact aquatic habitats by limiting fish passage through culverts at road-stream crossings (Furniss et al. 1991) and increasing fine sediment in spawning gravels which in turn reduces dissolved oxygen levels and sub-surface stream flow and results in reduced spawning success by salmonids (Bjornn et al. 1991, Phillips et al. 1975). Some of the effects of roads can be mitigated by design changes that disperse, rather than concentrate road runoff by gravel surfacing (Burroughs et al. 1989, Furniss et al. 1991), seasonal road closures to protect roads without gravel surfaces from use during adverse weather, or by designating undisturbed protective buffers along streams to allow filtering of fine sediments (Roby et al. 1977). The effectiveness of streamside buffers generally increases with width, but the impacts of large-scale or chronic disturbances can still impact streams, even with relatively wide and intact buffer strips.

Direct and Indirect Effects

This section describes effects on soils and water from travel management of existing roads and trails. Soil erosion and sedimentation from new road building for timber sales and oil and gas exploration and development are described in sections Effects on Soil and Water Resources from Timber Harvest/Vegetation/Fuels Treatment and Effects on Soil and Water Resources from Oil and Gas Activities

Based on past road maintenance, about 23 percent of the WCNF roads have been maintained. Some of these roads are intentionally not maintained because some users desire a rough driving experience. Many of the roads that are not maintained have a cobble or gravel surface that do not have an adverse effect on soil and water conditions. Generally, road maintenance is done on roads with the highest use and helps to minimize erosion and sedimentation into streams from these roads by providing proper drainage from the road. The remaining WCNF roads are not maintained and some of these contribute sediment to streams. New roads would be designed to minimize erosion and would be located to provide a buffer from streams.

During the last 15 years about 148 miles of road have been decommissioned, which is a rate of about 10 miles per year. Road decommissioning is anticipated to continue under all alternatives at a similar rate. The main difference between alternatives is the additional decommissioning of roads and motorized trails in recommended wilderness (Prescription Number 1.5). With respect to roads and trails, Alternative 1 would improve soil and water conditions the fastest by closing to motorized use and decommissioning 2 miles of existing roads and about 76 miles of motorized trails. In Alternative 2, about 7 miles of trails would be closed to motorized use and be decommissioned. In the long-term, these roads and trails will revegetate and soil erosion would be negligible. Alternatives 3 through 7 would have no roads or trails closing to motorized use and decommissioning in recommended wilderness (Prescription Number 1.5) and would not improve soil and water conditions from this activity. Since all alternatives would decommission some roads and rehabilitate trails that are currently in poor condition there would be an improvement in soil and water conditions with respect to roads and trails for each alternative.

Effects on Soil and Water Resources from Timber Harvest/Vegetation Treatment

Timber harvest can impact stream flows by altering the water balance within a watershed or by affecting the rate at which water moves from hillsides to stream channels. Removal of vegetation in forested watersheds alters the watershed response to precipitation by reducing interception, evaporation and transpiration and increasing water storage and runoff.

Opportunities to increase water yield are greater in forests associated with higher precipitation, and higher precipitation is associated with higher elevations in the western US. Research treatments aimed at increasing water yield have been applied to large portions of relatively small watersheds, generally less than one square mile in size. In these small watersheds, any increases in water yield generally occur during the wettest time periods. Studies by Hibbert suggest that the increase is a uniform percentage on the hydrograph over the range of flows investigated. This means that if low flows were increased in one study by 15% for significant treatments then

flood peaks also increased by 15%. In areas much greater than one square mile, realities of generating significant water yield are limited by land ownership, land allocation, vegetation types, variable elevations and aspects, and other multiple resource needs (USDA Forest Service 2002d).

The USFS publication, Water & the Forest Service (USDA Forest Service 2000j) responds to the question "Can Forests be Managed to Improve Stream Flow? It states that:

> Flooding and sedimentation from cutover lands was one of the primary reasons for establishing national forests. The timing of water yields was also an important issue, especially the desire to augment late-season flows.
>
> Vegetation cover and on-site control measures effectively reduce flood peaks. However, significant shifts in the timing of late-season runoff are not likely to be achieved through managing forest vegetation and snow across national forest lands. Treatments that restore slopes, meadows, and channels; increase the routing time between precipitation and runoff; and recharge ground waters can be expected to have a greater effect in sustaining late-season flows.
>
> Although theory suggests that vegetation management can produce more streamflow, for a variety of reasons, general water yield increases through forest management are likely to fall in an undetectable range. The data suggest that relying on augmentation from national forests will not be viable strategy for dealing with water shortages. Reducing water consumption, and improving conservation, can make greater gains and establish water markets to allocate scarce supplies more sufficiently.

Direct effects on soils include increased surface soil displacement and compaction from disturbance by road construction, log skidding, log landing construction and burning of logging slash after timber harvest (Christner et al. 1982, Harr 1983). Full tree skidding during harvest to a centralized log landing can serve to concentrate limbs and branches, and remove a source of valuable nutrients from the harvest area. The net result of detrimental soil disturbances can be an indirect loss in long –term soil productivity. The greatest ground disturbance per unit area usually is done by ground-based skidding equipment, where logs are hauled across the soil to landing areas. Yarding schemes which cause less ground disturbance than ground-based skidding have usually not been employed due to a local lack of alternative types of equipment, although availability is also affected by local economics. Slope instability and landslides may increase following timber harvest due to lost root strength within the soil mantle (Swanson et al. 1976, Furniss 1991). Consequently, timber harvest and associated roads, skid trails, and landings can adversely affect water quality by increasing sedimentation, associated nutrient loadings, and decreasing dissolved oxygen.

Direct and Indirect Effects

The largest effect from timber harvest is from road building activities associated with the removal of the timber. These new roads represent a permanent loss of productive soil acres. Thus, there is a permanent conversion to non-productive ground during the life of the road.

When the roads are not to be used for timber harvest they would be decommissioned and the soils would regain their productivity. Alternative 1 is expected to have no adverse effects to soil, water and air resources from new road construction because no new roads are allowed. In Alternatives 2, 6, and 7, some short-term erosion from roads is expected because about 6 miles (10 acres) to 7 miles (12 acres) of new road is anticipated for timber harvest activities. Alternative 3 would have a greater potential for short-term soil erosion and sedimentation because 39 miles (66 acres) of new road construction for timber sales is anticipated. Alternatives 4 and 5 have the highest potential for short- and long-term soil erosion and sedimentation because it is estimated that about 49 miles (83 acres) of new road construction would be needed over the planning period. Roads constructed under Alternatives 4 and 5 will be needed to support future harvest activities (prescription 5.2), and would likely be left open longer than in other Alternatives. In the long-term, potential soil erosion will be much less under Alternatives 2, 6, and 7 since new roads in prescriptions other than 5.2 would likely be closed soon after the vegetation treatments are completed.

Some soil erosion and compaction is likely to occur from the harvest of timber, and would increase roughly in proportion to the acres proposed for harvest under each alternative. The acres proposed for harvest include aspen/conifer vegetation treatment and aspen/conifer commercial harvest from MPC 5.2. Accordingly, with a predicted harvest on about 12,500 in Alternative 4 and 15,500 acres in Alternative 5 during the planning period, these Alternatives are expected to have the highest potential for soil erosion and compaction. Alternatives 2, 3 and 7, with a predicted harvest between 6,500 and 8,500 acres, will have less potential for soil erosion and compaction than Alternatives 4 and 5, but slightly more than Alternative 6 with harvest levels estimated at about 5,000 acres over the planning period. Effective implementation of Soil and Water Conservation Practices would help to minimize these potential effects. No direct impact from timber harvest is expected in Alternative 1 because no harvest is allowed.

A long-term indirect effect of Alternative 1 is the potential for a large fire that could consume large contiguous areas of timber since no harvest or vegetation treatment other than wildland fire use would be allowed. Large fires could result in extensive areas with low ground cover for at least the first year after a fire and would increase the potential for soil erosion and sedimentation of streams.

An indirect effect of timber harvest is an increase in water yield from reduced evapotranspiration of vegetation. On a Forest-wide basis it is not likely that the water yield from any alternative will be either measurable or quantifiable. This is because it is not known at the Forest Planning level which individual watersheds will have the treatments. Furthermore, only at a site-specific level do we know the portions of those watersheds that might be treated (elevation, aspect, time of harvest), and those are the precise factors necessary to estimate a water yield. Therefore, at a scale as course as the Forest Planning level, the best indicator of possible water yield differences between alternatives would be to compare the estimated acres of vegetation removed for the vegetation type most likely to effect water yield (aspen/conifer). For this analysis the silvicultural treatment for aspen/conifer commercial harvest is assumed to be the same as aspen/conifer vegetative treatment. Both treatment types are included for the water yield indicator.

Using acres as an indicator, alternative 5 would have the highest direct potential to increase water yield since it treats the most acres of aspen/conifer at 15,500 acres with Alternative 4 being similar at 13,500 acres. Alternatives 2, 3, 6, and 7 have similar acres treated, ranging from 5,000 acres to 8,500 acres. No direct effect to water yield from aspen/conifer treatment is expected in Alternative 1 since no treatment occurs.

Effects on Soil and Water Resources from Recreation

Recreational impacts may include rutting, erosion, and loss of ground cover from user created roads and trails; trampling of vegetation; vegetation removal; and soil compaction of streamside and upland sites. They may be similar in type, but of a different magnitude, than the impacts associated with livestock grazing (Clark et al. 1991). Rutting may increase surface erosion associated with heavily used hiking or horse trails and off-road vehicles. High use of some campsites may cause root damage in trees, resulting in reduced vigor or mortality. When snow packs do not provide adequate cover over-the-snow vehicles can damage vegetation and cause ground disturbance.

Many developed campsites occupy flood plains or are located within riparian areas resulting in direct impacts to streamside vegetation and alteration of the establishment mechanisms of riparian plants. At many sites, understory vegetation is either greatly reduced or removed completely over time, resulting in altered vegetative composition and stand structure as well as increased runoff and sediment delivery to adjacent streams and lakes. In the extreme, these changes can reduce stream shading, destabilize channels, and degrade water quality. Poor sanitary conditions at undeveloped campsites can also impact water quality with increased levels of coliform bacteria resulting from bathing, dishwashing, etc. Fishing may directly affect aquatic habitats in areas where recreation use and fishing pressure is highest, resulting in reduced fish populations.

Direct and Indirect Effects

In Alternative 1, no new recreation development will be allowed and existing developed recreation sites would be maintained. Since management of developed sites is allowed, no new motorized recreation is allowed, and no new sites are allowed, Alternative 1 would result in the fastest improvement in soil and water conditions of all the alternatives. For Alternatives 2 through 7, effects on soil and water resources would be the same from projected recreation outputs of 2 new developed sites and 10 recreation sites maintained or rehabilitated during the planning period.

In all alternatives, OHV use is expected to increase along with improper use off of designated trails that may adversely affect soil and water resources. Unauthorized OHV use commonly occurs in areas alongside designated roads and trails because of immediate access to the area. Alternative 1 reduces the potential for unauthorized OHV use the most of all the alternatives by closing 2 miles of roads and 76 miles of trails. Alternative 2 reduces the potential by closing 7 miles of trails. Alternatives 3 through 7 do not reduce the potential because no roads or trails are closed.

In Alternatives 5 only, new ski area development and ski area expansion would be allowed at several existing ski areas which has the potential for additional erosion and sedimentation from road construction, snowmaking system construction, and trail modifications. Water development may be needed for snowmaking in expanded ski area, which has the potential to reduce flows in streams.

Effects on Soil and Water Resources from Livestock Grazing

Livestock grazing directly impacts soil infiltration by trampling, soil compaction and loss of vegetative cover on both upland and riparian sites. Fecal wastes can increase bacterial concentrations in water through livestock defecation in a stream or riparian area. Soil and water quality can be indirectly affected by the resulting increased soil runoff and erosion, and sediment delivery to adjacent riparian areas and streams (Holechek et al. 2001). Impacts are often greater in riparian zones because they are preferred because of the availability of shade, water and more succulent vegetation (Platts 1991). Over longer time periods, grazing can result in increased fine sediment loads from stream bank erosion, loss of riparian habitats by stream channel widening or degradation, and lowering of water tables through channel degradation.

Changes in grazing management such as rest, implementation of rest-rotation grazing schemes, reduced livestock numbers and adherence to forage utilization standards can lead to improved range and riparian conditions (Gifford 1975). Grazing may result in low magnitude but long-term impacts to aquatic systems, especially from changes in ground cover, species composition, and sedimentation rates and are difficult to detect because the aquatic systems themselves are dynamic and naturally variable (Platts 1991). In addition, degraded stream channels may remain in relatively poor condition for long periods after the original impact due to the way that sediment is stored and routed through natural channels making it difficult to identify the principal cause of degradation.

Direct and Indirect Effects

Between alternatives, the effects on soil and water resources from range management are similar in most alternatives because the 1996 Rangeland Health Amendment will apply to all alternatives. There are a few key differences between Alternatives for watershed effects including the relative amounts and likelihood of success with implementation of removal of or differential forage use of areas in unsatisfactory condition, and the relative number and acreages of vacant allotments closed.

Alternative 7 includes a lower forage utilization guideline for key species in uplands and riparian areas that are in unsatisfactory condition making likelihood of improving these areas somewhat higher than Alternatives 1, 2, 3, and 6 which remove these areas from the suitable land classification and Alternatives 4 and 5 which depend on future site-specific analysis to identify approaches to improving these areas. Alternative 2 would have the greatest reduction in the amount of area suitable for grazing, with subtraction of unsatisfactory condition areas as well as 26,000 acres for cutthroat trout management. Since livestock grazing could be removed from these contiguous watershed areas, improvements to soil and water resources would have a high probability. Changes to soil and water conditions expected from unsatisfactory condition

capable acres removed (in Alternatives 1, 2, 3, and 6) would be variable because of site-specific factors. Areas in unsatisfactory condition that can be easily avoided through livestock herding, and/or salting would be most likely to improve in ground cover and species composition over the long-term. Areas that are fenced or can be fenced would also be likely to improve if removed from livestock grazing. Areas in unsatisfactory condition that are relatively small, scattered, or in locations where it is difficult to avoid grazing without expensive structural improvements (fence construction) would be much less likely to improve. Given that acres for this analysis were extrapolated forest-wide from areas with monitoring, the relative proportions of the above conditions are unknown. There would likely be a range of improvement probability that can only be predicted with site-specific assessment. Alternatives 1, 2, and 6 would result in this range of improvement on a total of 18,300 upland and riparian acres and Alternative 3 would result in 2,100 acres with a range of improvement on riparian acres. The Revised Forest Plan also guides future allotment management plans and annual operating instructions to consider standards for bank trampling and riparian woody utilization.

Although currently vacant allotments are available for use in several alternatives, vacant allotments are not likely to be filled any time soon because of the limited budget available to complete analyses for and administer active grazing allotments. Therefore, the short-term on-the-ground consequences of these alternatives would be similar to closure- i.e. the vacant allotments would remain in ungrazed condition. Given this, closure of vacant allotments is considered only as a long-term effect. Alternatives 1 and 2 provide the most long-term watershed benefits closing all vacant allotments. Alternative 7 provides somewhat less long-term watershed benefits than 1 and 2 because it focuses closures only on Salt Lake and Davis County watersheds and on the three allotments in the Eastern Uinta Mountains Management Area. Alternative 6 provides the long-term benefits for these three allotments but not for the other vacant allotment areas. Alternatives 3, 4, and 5 do not close vacant allotments thus not providing for long-term benefits although as explained above, short-term the allotments would likely continue to remain in ungrazed condition accruing those benefits for the short-term.

Effects on Soil and Water Resources from Hard-Rock Mineral Development

Within the administrative boundary of the WCNF, hard-rock mining has occurred primarily in Big and Little Cottonwood Canyons east of Salt Lake City and in the Stansbury Mountains. Most of the mines are historic, abandoned, and located on private land within the Forest administrative boundary. Hard-rock mining can contaminate water through acid mine drainage, toxic metals, chemical processing agents, and erosion and sedimentation (Da Rosa, et al. 1997).

Direct and Indirect Effects

Currently, no hard-rock mining sites have been identified that have shown contamination of soil or water resources where remedial action is necessary on lands under the jurisdiction of the WCNF. Based on development trends on the Wasatch-Cache National Forest during the previous 20 years, no new hard-rock operations are anticipated during the next planning period. If sites are found that contaminate soil and/or water resources, Alternative 1 would not allow for cleanup of the site. All alternatives will allow remedial action and protection of soil and water resources.

Effects on Soil and Water Resources from Oil and Gas Activities

This section provides a description of potential general effects on soils, water, riparian, and wetland, steep slopes and geologic areas from oil and gas exploration and development. This section is organized by general effects and effects by each alternative. General effects are described as potential without protective or reclamation measures employed.

General Effects

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" described in Topic 9 – Oil and Gas. It is estimated to be about 68,300 acres.
Steep Slopes and Geologic Hazards – Although the direct impacts to steep slopes and geologically unstable areas as a result of oil and gas construction activities are not significant in and of themselves, conditions are created that cause significant impacts to surface resources and resource uses. Construction activities in steep slope areas result in the direct removal and loss of soil from steep sidehill cuts or the sidecasting of earth materials onto undisturbed slopes, lost vegetation, alteration of soil structures, soil compaction, and loss of topsoil resources. Surface disturbing activities in unstable areas and steep slopes increase surface water runoff, accelerate erosion, interfere with drainage systems, increase landslide and rockfall potentials. The potential for long-term mass movement, exposure of underlying materials, and erosion are increased significantly on unstable landslide and rock-fall areas.

Locating well sites, roads, pipelines, and similar type facilities on steep slopes greatly increases the height of cuts and length of fills that are needed to provide sufficient room to accommodate the facility or the use to be made of the site. The increased cuts and fill areas also increase the amount of land area subjected to surface disturbance. The steeper the slopes, the greater the area affected. Sidehill cuts and fills on slopes greater than 40 percent require extensive highwall cuts that cause instability of the upper slopes. Roads and pipelines have the greatest potential to intercept and activate or reactivate unstable areas that are susceptible to land slides, rock fall, mass slumping and erosion.

Exploratory drilling is generally only a short term activity and reclamation of disturbed areas follows immediately upon completion of activities. Because of the relative short time unstable areas are exposed to increased instability, the probability of successful reclamation and restoration of stability to the site is increased significantly. If field development and long term production of oil and gas are undertaken in areas of steep slopes and other unstable conditions, the probability of maintaining longterm stability is significantly reduced. The potential for successful reclamation, stabilization and restoration under such conditions is significantly reduced.

Soils and Unstable Soils – Impacts to soil productivity range from the direct removal of vegetation and soils, to the burial of topsoil by sidecasting of earth materials onto undisturbed surfaces, soil compaction, soil alteration, displacement and loss through erosion. These lead to accelerated runoff and erosion, increased sediment loads in streams, alteration of drainage

systems and reduced water quality. Impacts resulting from soil loss would be significant if reclamation measures are not employed.

Most soil losses associated with oil and gas developments occur during the construction of well pads, roads and pipelines. The degree to which soils are impacted from oil and gas activities depends on the type of soils and topographic conditions at the construction sites. Unstable soils are particularly sensitive to road, well pad and pipeline construction. Overall, the chance for significant soil impacts occurring is much higher in areas of inherently unstable soils.

Impacts to soils from exploratory drilling activities are generally short-term because access roads and well pads operate only long enough to determine the viability of long-term production. Should a discovery of oil and gas occur, the impacts to the soil resources will increase significantly as a result of the construction activities needed to accommodate the well sites, access roads, pipelines, gas processing plants, tank batteries, and other oil field support facilities. Disturbances and loss of soils resulting from development fields is expected to be long-term.

Surface Water – The potential for greatest impact to water resources would be from a spill of oil or release of other pollutants directly into a stream or water course. Sediment loading of surface waters as a result of surface disturbing activities is another potential impact associated with oil and gas activities. Downstream effects include lower water quality and diminished aquatic habitat effectiveness. Under extreme circumstances, there may be a direct loss of water use, fish, waterfowl and other water-dependent animals as well as adverse effects to human health.

Oil and gas construction activities that involve the removal of vegetation and earth work usually result in short-term increases in sediment production when water flows erode exposed soil materials. Some local stream reaches may be directly impacted by construction activities at road and pipeline crossings. Impacts from increased sedimentation are usually short term and insignificant if erosion and sedimentation controls, revegetation, and reclamation are timely implemented.

Ground Water – Impacts to groundwater quality from oil and gas operations may result from either unprotected wells during drilling and production or from the intentional or unintentional release of contaminates to the environment. Water bearing zones may be encountered and penetrated by well bores during drilling. Drilling fluids and saline production water could impact fresh water aquifers if properly weighted drilling muds are not used and borings are not properly cased and cemented. Oil, drilling muds, fuels, chemicals, saline production water, and human biological waste can easily enter groundwater systems during storage, handling, transportation and disposal. Leakage from unlined reserve pits, fuel and chemical storage areas, and other similar type situations are also potential contaminate sources.

Riparian and Wetland Areas – Assuming that no protection of wetlands/riparian areas was to be undertaken, the principal impacts to wetlands and associated riparian areas would occur during clearing and earth-moving operations needed to construct access roads, well pads, and ancillary facilities. Direct impacts could include the loss of riparian vegetation, increased erosion, soil loss and deterioration of water quality. Secondary or indirect impacts could include loss of plant

and animal habitats as well as habitat diversity, alteration of plant communities and biological productivity. Impacts to wetland and associated riparian areas would not only include the direct removal of riparian vegetation and loss of wetland area, but construction activities outside the wetland areas may also disrupt the water sources. Oil and chemical spills could be expected to occur at several times during the life of an oil and gas field. These could cause severe and long term damage to wetland/riparian ecosystems.

Direct and Indirect Effects

Special lease stipulations affect where exploration and development occur within a lease area. Stipulations vary between alternatives and have a direct affect on the potential for erosion and sedimentation. For watershed concerns, lease stipulations vary according to how they allow activities on unstable soils, geologic hazards, land slopes greater than 40 percent, wetlands greater than 40 acres, and riparian areas greater than 40 acres. Table OG-4 lists the lease stipulations according to each alternative.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alt 4) an area of existing leases, 19,000 acres in the Table Top Exploratory Unit, could be explored and result in effects to soil and water resources. The degree to which exploration is predicted within the Table Top Unit is affected by whether or not new leases could be issued and under what stipulations.

Each alternative has new roads and pads that represent a loss of productive soil acres. Thus, there is a conversion to non-productive ground. The total acres for each alternative are presented in the individual discussion of each alternative below.

Though **Alternative 1** does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Exploratory Unit has an estimated 20 acres converted to non-productive ground because of oil and gas exploration activities. Impacts to steep slopes, geologic hazards, unstable soils and surface water could result from oil and gas development on private minerals. As existing leases terminate, lands would no longer be available for leasing.

Alternative 2 is very similar to Alternative 1. Again, development of existing leases within the Table Top Unit has an estimated 20 acres converted to non-productive ground because of oil and gas exploration activities. Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining available acres, new leases could be issued but surface occupancy would not be allowed. It is doubtful that development of oil and gas resources would be undertaken when adjoining Federal lands are not available for surface occupancy and there is no possibility of exploiting oil and gas resources from adjoining lands.
Steep Slopes and Geologic Hazards – Except in situations where access cannot be denied to existing leases or private minerals, no impacts would result from construction on steep slopes or other unstable areas if this option were implemented.

Surface Water, Riparian and Wetland Areas - The potential adverse effects to surface waters, riparian and wetland areas would not increase if this leasing option were to be implemented.

Groundwater – The potential for impacts to occur to the groundwater resources would be decreased significantly if this option were to be implemented. Impacts would be limited to those that may occur from operations currently being conducted on existing leases or interspersed private minerals.

Alternative 3 precludes leasing availability in areas recommended for wilderness in the future and does not allow new leases with surface occupancy in areas managed for undeveloped (Prescription 2.6) and backcountry recreation (Prescription 4.1 and 4.2) values and terrestrial habitat (Prescription 3.2). Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,400 acres are available under Standard Lease Terms. Oil and gas exploration and development activities have an estimated 75 acres converted to non-productive ground. Some of this development is predicted on existing leases within the Table Top Unit. The degree of effects depends on the leasing terms applied. Refer to Alternative 2 for a description of effects from No Surface Occupancy and Alternative 5 for a description of effects from Standard Lease Terms.

Geologic hazards and unstable soils are leased with a Controlled Surface Use stipulation. The stipulation would require that activities be located so as to avoid or minimize impacts to these areas, and the design and reclamation plans for the activities provide for mitigation. However, it may not be possible in all cases to totally avoid geologic hazard areas unavoidable impacts could still occur from the construction of roads, well pads, pipelines, and plant sites in these areas. Slope failures, erosion, topsoil displacement and loss and sedimentation of streams could still occur. Impacts from exploratory drilling would expected to be insignificant and short term under this leasing option, however, impacts may be significant and long term if an oil and gas field were to be developed. Because this alternative allows occupancy, the chances for significant adverse impacts have not been totally eliminated.

Soils and Unstable Soils – Because the CSU stipulation specifies avoidance and reclamation of unstable soil areas, disturbances occurring under this alternative would be low and short term for exploration activities and moderate and long term for oil and gas field development and production. Increased protection of unstable soil areas reduces the probability that significant adverse impacts would occur. Soil losses in highly erodable soil areas would be minimized and may be held within acceptable limits provided that the use is made of effective erosion control, reclamation, and revegetation practices as well as appropriate engineering design of roads and well pads. The impacts to the exploration, development, and production of oil and gas is not expected to be significant.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to soil and water resources are predicted.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas exploration and development activities have an estimated 105 acres converted to non-productive ground. Some of the effects could last 20-30 years because of field development. Other mitigation measures that could be

required as conditions of approval could include moving the site up to 200 meters (656 feet) if the site could be better located.

Steep Slopes and Geologic Hazards – If steep slopes and geological instability are found to occupy very large areas, the lessee may not be able to move a sufficient distance to avoid occupying such areas. There are also situations where unstable and steep slope areas, when taken together with other protected areas, result in combined areas to large to require avoidance. When these areas cannot be avoided, reliance would have to be placed on special construction and reclamation techniques to mitigate impacts. Under the circumstances, this alternative is the least restrictive and offers the greatest potential for significant adverse impacts to occur.

Soils and Unstable Soils – Under this option, mitigation of impacts to soils will be required as a condition of approval. It may be required that wellsites, roads, tank batteries, pipelines etc. be located at the most topographically suitable locations available consistent with the terms of the lease. In unstable soils areas, special measures such as contouring, terracing, gouging, scarifying, and installation of waterbreaks, may be needed to provide additional site stability before reclamation.

Under normal soil conditions, most impacts to soil resources and soil related impacts can be satisfactorily mitigated under the standard lease terms, however, when steep slopes or unstable soil areas cannot be avoided, the impacts may be unavoidable, longterm, irrepairable, and unacceptable. This leasing option is the least restrictive and offers the greatest potential for significant adverse impacts to unstable soils. It can be expected that this leasing option will have a low, short-term impact to soils under normal soil conditions but high, long-term impacts when unstable soil conditions cannot be avoided. Impacts to soils would be low to high and short term for exploration activities and moderate to high and long term if oil and gas field were undertaken.

Surface Water – Although this leasing option appears to have the highest potential to result in adverse impacts to surface waters, compliance with the Clean Water Act and implementing State and Federal regulations is mandatory. Under most circumstances, undesirable locations for well sites and other facilities can be avoided, and operations can be delayed to avoid undesirable weather and field conditions that would result in accelerated erosion and increased sediment production. Under this leasing option, adverse effects to surface waters including increases in runoff from drill sites and access roads. Increased stream sediment derived from construction activities cannot be totally eliminated but can be substantially mitigated.

The Environmental Protection Agency (EPA) requires that oil and gas production and storage facilities have adequate spill protection documented in the Spill Prevention Control and Countermeasure Plan. Although threat of water contamination from oil spillage cannot be totally avoided; a well-devised spill plan may prevent serious damage, should a spill occur.

It would be expected that potential impacts would be low and short-term for exploratory activities and low-to-moderate and long-term for oil and gas field development and operation. Impacts should be minor and temporary from construction activities if erosion control measures

and reclamation are undertaken immediately after construction. There would be no irretrievable commitment of water resources under this leasing option.

Ground Water – It is anticipated that the potential for impacts to groundwater to occur would be low for a single well and moderate for oil field development and operations. If substantial alteration of the groundwater quality were to occur, it would be a long-term impact and, for all practical purposes, irreversible. However, it is not anticipated that an irritrievable commitment of groundwater resources would occur under this alternative. Existing requirements in the regulations governing the drilling of wells, disposal of produced water provide sufficient opportunities to assure that impacts to groundwater would not occur.

Riparian and Wetland Areas - Wetlands are protected under Section 404 of the Clean Water Act. Under the requirements of the Act, jurisdictional wetlands and coincidental riparian areas are to be avoided whenever possible and the impacts mitigated when avoidance is not possible. A permit is required to occupy or otherwise affect a "jurisdictional" wetland/riparian area. The permit is normally conditioned on the protection or replacement of the wetland/riparian resource.

However, because occupancy of all wetland/riparian areas is not precluded by existing law or lease terms, there is no guarantee that the potential impacts described under the General Effects section would not occur. Oil and gas activities in wetland/riparian areas may still occur and result in the loss of wetlands and associated riparian areas, including special wildlife and native plant habitats. Wetlands could also be adversely affected by an increase in sedimentation, and decreased water quality, and changes to existing drainage patterns and flows.

In **Alternative 6**, leasing availability in areas recommended for wilderness is precluded in the future. New leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized recreation values and terrestrial habitat. Oil and gas exploration and development activities have an estimated 75 acres converted to non-productive ground. Some of this development is predicted on existing leases within the Table Top Unit. In this alternative geologic hazards and wetlands and riparian areas over 40 acres are protected in new leases with no surface occupancy so the effects to soil and water resources are similar to Alternative 2.

Alternative 7 would preclude leasing on 20,400 acres recommended for wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Oil and gas exploration and development activities have an estimated 85 acres converted to non-productive ground. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Similar to Alternative 3, geologic hazards and unstable soils are leased with a Controlled Surface Use stipulation. The stipulation would require that activities be located so as to avoid or minimize impacts to these areas, and the design and reclamation plans for the activities provide for mitigation. However, it may not be possible in all cases to totally avoid geologic hazard

areas, unavoidable impacts could still occur from the construction of roads, well pads, pipelines, and plant sites in these areas. Increased protection of unstable soil areas reduces the probability that significant adverse impacts would occur. Soil losses in highly erodable soil areas would be minimized and may be held within acceptable limits provided that use is made of effective erosion control, reclamation, and revegetation practices as well as appropriate engineering design of roads and well pads. The impacts of exploration, development, and production of oil and gas is not expected to be significant.

Areas available for surface occupancy with more stable soil conditions would be leased with standard lease terms. Soil and water conservation practices would be applied to any soil disturbing activities caused by the developments. It is expected that through implementation of these practices that erosion and sedimentation would be minimized from these activities. Wetlands and riparian areas greater than 40 acres are available for leasing but with no surface occupancy. Water quality should be adequately protected because compliance with the Clean Water Act and implementing State and Federal regulations is mandatory.

Further impacts to the vegetation could occur as a result of the development of private minerals. Oil and gas activities on lands with private minerals are not required to meet Forest Plan standards.

Effects on Soil and Water Resources from Fire Management/Fuels Treatments

Fire consumes vegetation, partially or completely removes ground cover and may or may not result in the formation of water repellant soil layers, depending on soil temperatures during the burn and the characteristics of the local vegetation and soils (Debano et. al. 1966). Fires may result in increased stream flows following fires due to removal of vegetation and decreases in evapo-transpiration (Helvey 1980). The magnitude of impact on watershed processes is dependent on physical and biologic attributes of individual watersheds and on the severity of the fire. Low severity fires, by definition, have little long term effect on ecosystem functions, and in fact can be beneficial to soil and water quality by reducing fuels buildup and the potential for higher severity fires. For some vegetation types (i.e. lodgepole pine, spruce-fir forests) stand replacement fires were part of the normal *historic* range of variability. However, some vegetation types have changed due to the exclusion of fire (i.e. oak brush, sagebrush, Douglas-fir) and current fires in these types are typically severe and the effects are outside of the *historic* range of variability. Currently, high severity fires in these vegetation types alter above ground vegetation, soil organic material, and litter to such an extent that watershed properties such as runoff, erosion, and sedimentation are pushed far outside the normal range of variability (Durgin, 1985). In central and northern Utah, areas impacted by moderate to high severity fire are particularly susceptible to high-intensity summer thunderstorms which can produce extreme surface erosion, debris flows, or landslides that, in turn, have the potential to impact downstream property, especially along the Wasatch Front. Erosion rates after large high severity fires may be elevated above background levels by more than a factor of 200 immediately after the fire (Morris et. al. 1987) and, in extreme cases, may persist for decades following a fire. Under controlled circumstances, fire use and mechanical treatments can modify existing vegetation or reduce excess fuel loadings that could otherwise lead to a high severity fire. In most of the forested

areas of Utah the role of fire in maintaining forest ecosystems has been greatly altered by aggressive fire suppression efforts since around 1900. This may have provided near-term protection to local watersheds from the effects of severe fires, but it has also led to a buildup of fuels that makes the possibility of such fires more likely.

Effects of mechanical treatments on soil and water resources may vary greatly. Activities such as cutting by hand with a chain saw, crushing, or chipping have very little impact on the soils and may improve ground cover. Activities such as cutting using tracked equipment and chaining using a bulldozer and chain may cause some short-term soil erosion from soil disturbance from ruts left by the tracks and/or chains or from lack of ground cover left on site when vegetation is removed. Chemical treatments or biological treatments may cause short-term erosion from lack of ground cover until vegetation establishes itself again.

Direct and Indirect Effects

Several general effects are expected to soil and water resources from fire management and fuel treatments. For every Alternative, short-term soil erosion and sedimentation could occur from fuels treatments. In oak communities over the long-term, Alternatives 2 through 7 will reduce adverse effects to soil and water resources from wildfire by treating oak under prescribed fire conditions and mechanical treatment with the objective of reducing the potential for severe, unwanted wildland fire in this vegetation type. In conifer, wildfire potential and subsequent adverse effects to soils and water resources are expected *to increase* over the long term because the amount of vegetation treatment (*prescribed* fire and mechanical) is so little compared to the total amount of forested area.

Wildland fire use is allowed under all alternatives on most areas of the Forest and its use will not vary by alternative. There is a wide range of effects that could occur from wildland fire use. It is expected that very little adverse effects will occur to soil and water resources because wildland fire use will be managed to cause low impacts to resources. However, there is a potential that wildland fire could exceed a trigger point that would put the fire into a suppression mode and higher impacts to soil and water resources may occur.

Benefits to soil and water resources from the use of fire and fuel treatments will be seen in Alternatives 2-7 on the small watershed scale. In a few watersheds, treatments will substantially reduce the risk of high severity burns. In the short-term, some increase in soil erosion and sedimentation may occur from prescribed fire in these smaller watersheds in Alternatives 2-7.

For the comparison of alternatives, the effects of prescribed fire and mechanical treatments on soil and water resources are considered very similar because both of these activities have the potential for ground disturbance, ground cover reduction, and erosion; these treatments are expected to be done at times when impacts to soil resources are the least such as mechanical treatments when the soil is dry and prescribed fire and wildland fire use when soils and weather conditions will only cause low soil burn severity. Because site-specific actions are not described at the Forest Plan level, the combined treatment area for prescribed fire, wildland fire use, and mechanic treatments is used as an indicator of the potential for soil and water effects.

In Alternative 1, prescribed fire and mechanical fuels treatment would have the least effect to soils and water because its use is not allowed. In Alternative 2, prescribed fire and mechanical treatment have the highest potential to adversely affect soil productivity and erosion because these treatments would be used on most acres, about 18,000 acres per year. In Alternatives 3, 6 and 7, prescribed fire and mechanical treatments have less potential to adversely affect soil resources since the amount of treatment is estimated at about 8,200 acres per year. Alternative 4 has a slightly higher potential to adversely affect soil and water resources since prescribed fire and mechanical treatments are expected on about 9,000 acres per year. Of the alternatives with prescribed fire and mechanical treatments, Alternative 5 would have the least potential to adversely affect soil and water resources because less area is treated, being about 4,500 acres per year. Effective implementation of Soil and Water Conservation Practices, particularly those that minimize severe burns, avoid heavy equipment in riparian areas, and distribute fire use both temporally and spatially, would help to minimize these potential effects.

Effects on Soil and Water Resources from Water Developments

Hydrologic effects of water development include, flow depletion, flow augmentation, and flow regulation downstream of dams and reservoirs. Flow depletions can result in lost riparian habitat and reductions in fish populations and aquatic habitats. In-channel structures fragment habitats by blocking fish migration or by dewatering sections of streams. Increased stream flow can result in altered channel form, channel widening, bed aggradation, or increased channel migration rates, all of which can lead to lost riparian vegetation and increases in sediment loads (Dominick et. al. 1998). Numerous streams are diverted at or near the Forest boundary for use in irrigation, or for domestic water supplies.

Direct and Indirect Effects

The impacts to soil and water resources from existing permitted or authorized water developments will not vary by alternative. Under all alternatives, access and maintenance of these water development facilities will continue to be allowed.

The effects on soil and water resources from new water developments varies by alternative according restrictions on the ability to develop the water. The main restrictions would be from no motorized access or ability to build roads in order to construct the water development. The potential for new future development of some water sources on the WCNF would be limited by recommended wilderness and/or roadless areas because no motorized access is allowed in wilderness and no road building is allowed in Alternatives 1, 2, and 6, and in some prescription categories in Alternatives 3 and 7. Water development would be restricted the least in Alternatives 4 and 5 because they have the least area restricted to road building or access. These alternatives have the highest potential for adverse effects on soil and water resources from water development.

Cumulative Effects

The Council on Environmental Quality's regulations define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or persons undertakes such actions (40 CFR Section 1508.7)". The range of alternatives considered must include the no-action alternative as a baseline against which to evaluate cumulative effects. Cumulative effects result from spatial (geographic) and temporal (timing) crowding of environmental perturbations. The effects of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the effect of the first perturbation (CEQ, 1997).

The approach for this analysis is to take a programmatic look at the Forest wide scale of past, present, and reasonably foreseeable activities on the WCNF that may positively or negatively affect soil and water. The cumulative effects analysis for soil, water, and geologic resources considers activities that affect soil and water resources. Since the Forest Plan makes no "on-the-ground" decisions, the most appropriate indicators for cumulative effects are reflected in the size and magnitude of the different resource programs most likely to affect soil and water resources, either positively or negatively.

Issues

There are three issues tracked through effects analysis on soil and water resources. They are, soil productivity, water quality, and water yield. On the WCNF, there are eight principle categories of management activities generally having the potential to affect one or more of the three issues. Of the eight categories discussed below, most have no potential to affect water yield. Water yield is only discussed in relation to Timber Harvest/Vegetation Management activities. All eight have the potential to affect soil productivity and water quality, and those issues are discussed throughout. No impacts to geologic resources have been identified from activities expected to take place on the WCNF in the next planning period. The cumulative effects analysis will have a qualitative description of effects to soil productivity, and a qualitative description of the potential effects to water quality and yield to describe the cumulative effects of the alternatives on soil and water conditions.

Cumulative Effects Area and Time Frame

Soil productivity effects are limited spatially to the site. Activities carried out on National Forest System lands do not typically affect off-site soil productivity. Therefore, the cumulative effects area for soil productivity is limited to the Forest boundary. When water quality is affected by increased sedimentation, off site effects can occur. Yet, since the Forest Plan prescribes no specific activity in any specific area, potential spatial and temporal effects to water quality cannot be attributed to any specific watershed. Cumulative effects to water quality can only be described in terms of potential to generally effect trends on a Forest-wide scale. In other words, the cumulative effects of a "program" (at the Forest Plan scale) as opposed to the effects from a "project" (at the site specific scale) can only be discussed in terms of general programmatic

tendencies either toward improved or declining water quality at no specific site. Consequently, there is no easily defined "area" that may experience cumulative effects beyond the Forest boundary. Therefore, the potential cumulative effects from Forest programs to water quality will generally be discussed at the Forest scale.

The time frame for this analysis is the next Forest planning period, about 10 to 15 years from now.

Past, Present, and Reasonably Foreseeable Actions

This section describes the past, present, and reasonably foreseeable actions that may have an affect on soil productivity, water quality, and water yield. These include WCNF management actions; land use and soil and water management in areas adjacent to the WCNF; and land use, development, population, and recreation trends; and state and local government environmental protection programs. Table GEO-3 is a summary of the past, present, and reasonably foreseeable actions that may have and affect on soil productivity, water quality, and water yield.

On the Wasatch-Cache National Forest

The management activities on the WCNF that may affect soil productivity, water quality are Roads and Access Management; Timber Harvest/Vegetation Treatment; Recreation; Livestock Grazing; Hard-Rock Mineral Development; Oil and Gas Activities; Fire Management/ Fuels Treatments; and Water Developments. A management activity that may have a substantial affect on water yield is Timber Harvest/Vegetation Management activities.

Several activities on the WCNF have improved soil and water conditions through road and travel management. The WCNF has about 1,500 miles of roads. Most of the roads that are maintained on an annual basis are main access roads and those that have the most use. Several roads have been moved out of riparian areas or decommissioned, and culverts installed in several stream channels where ford crossings were causing sedimentation. During the last five years, many roads that are graded have had new surfacing such as gravel or oil put on them to reduce the rate of road deterioration and has reduced the rate of erosion from the road surface. The maintenance and decommissioning of roads are expected to be at similar or slightly increased levels based on experienced budget levels. In the next planning period, Level 1 and 2 roads analysis should be completed. The travel plan for Evanston/Mt. View Ranger Districts should be ready for implementation toward the end 2002 and the travels plans for Ogden and Logan Ranger Districts should be completed in the next few years. With the completion of the Evanston/Mt. View Ranger Districts travel plan, it will be WCNF policy that roads will be closed unless designated open. Travel plans identify roads to remain open, roads to be closed and decommissioned.
A variety of timber harvest treatments have been used in the past and most harvest units are fully stocked. Since the 1940s, timber harvest treatments have occurred on almost 43,000 acres in 44 sixth code watersheds. Most of the harvest treatments occurred in the Eastern Uintas, Western Uintas, and Bear management areas during the 1970s and 80s on about 11-12,000 acres each decade. During the 1990s, almost 6,300 acres were harvested. A variety of treatments were used and include clearcut, partial cut, selection cut, shelterwood, and aspen chaining. Although there are some small areas, such as stream crossings, where small amounts of sedimentation occurs, at

Table GEO-3. Summary of the Past, Present, and Reasonably Foreseeable Actions that may affect Soil and Water Resources.

	Actions	Issue that could be Cumulative[1]	Primary Area Affected
On Wasatch-Cache National Forest			
	Road Construction	S, W	Eastern Uintas, Ogden Valley
	Road decommissioning	S, W	Forest wide
	OHV and ATV use	S, W	Cache-Box Elder, Bear, North Wasatch-Ogden Valley, Western Uintas
	Timber Harvest and Vegetation Treatments	S, W, WY	Eastern Uintas, Western Uintas, Bear
	Wildfire	S, W	Forest wide
	Prescribed Fire and Wildland Fire Use	S, W	Forest wide
	Developed Recreation Projects	S, W	Forest wide
	Livestock Grazing	S, W	Forest wide
	Abandoned Mine Land Cleanup Activities	W	Central Wasatch
	Oil and Gas Exploration and Development	S, W	Eastern Uintas, Western Uintas
	Impaired Waters Assessment and Remediation	W	Central Wasatch
Areas Adjacent to the WCNF			
	Urban Expansion and Land Development	S, W	Wasatch Front, Kamas area, Bear Lake, upper Bear River, Meeks Cabin Reservoir, Ogden Valley, Cache Valley
	Water Development and Planning	W	
	Population Growth	S, W	
	OHV and ATV use	S, W	
State and Local Government Environmental Protection Programs			
	State of Utah	W	Statewide
	Salt Lake County	S, W	Salt Lake County
	Salt Lake City	S, W	Salt Lake City and Drainages East of SLC

[1] S = Soil Productivity, W = Water Quality, WY = Water Yield

present, overall soil productivity and water quality have not been impacted from past harvest activities on the WCNF as indicated by the revegetation of treatment areas and streams in these drainages meeting state water quality standards.

The WCNF averages about 60 wildfires per year and 70 percent of the fires are less than 0.1 acres. The number of large fires (greater than 100 acres) appears to be increasing and the largest fire recorded since 1970 is 14,200 acres that occurred in year 2002. The use of prescribed fire has been very limited in the past. For the past three years the WCNF has prescribed burned about 1,250 acres per year, primarily in aspen stands. Dense, young vegetation has grown back quickly and very good ground cover currently occurs under most of the burned treatment areas.

These treatments have reduced the potential for wildfire and the potential for adverse effects on soil and water conditions resulting from severely burned and hydrophobic soils that occur from wildfire. Several areas along the Wasatch Front have high opportunities and needs for fuels treatments and it is anticipated that specific treatments, particularly mechanical treatments, will be used to treat fuels.

Many recreation projects have been completed that improve water quality and protect or rehabilitate soils. During the last planning period and particularly during the last five years leading up to the 2002 Olympic Games in Salt Lake City, many developed recreation sites have been improved by placing asphalt over gravel roads, putting cement pads in campsites, moving restrooms away from streams, and installing new restrooms. Hiking and biking trails have been relocated away from streams and wet areas, and bridges have been constructed across streams channels to protect water quality and aquatic resources. Soil productivity should improve in small areas within developed recreation areas due to adjusting the location of picnic sites and campsites, and roads in response to wetland concerns during reconstruction and maintenance of existing facilities. During developed recreation site reconstruction and maintenance in the last planning period, the location of campsites and restroom facilities have been adjusted for the protection of wet areas, improvement of soil productivity and water quality. These soil and water conservation measures are expected to continue in the future.

During the last planning period since 1985, off highway vehicle (OHV) and all terrain vehicles (ATV) use has increased greatly on the WCNF. OHV use is expected to increase along with improper use off of designated trails that may adversely affect soil and water resources. Unauthorized OHV use commonly occurs in areas alongside designated roads and trails because of immediate access to the area. The highest density of OHV use is in Cache/Box Elder, Bear, Western Uintas, and Stansbury management areas. The WCNF has been and will continue to close and decommission user-created ATV trails.

Ski resorts on the WCNF have modified some terrain and cleared vegetation for the purpose of improving ski trails, installing snowmaking pipelines, and installing new ski lifts, utility lines, and base facilities. The projects were done with specific soil and water conservation measures to minimize erosion and sedimentation and onsite inspections showed that these practices were effective in minimizing erosion and sedimentation. For example, projects at Snowbasin Ski Resort for the 2002 Winter Olympic Games had some of the largest land disturbing activities that the WCNF has ever had. The Best Management Practices that were used to minimize impacts on soil and water resources were very effective (USDA Forest Service 2001g). Using soil and water conservation measures will continue to minimize adverse effects from future activities on the WCNF.

Although livestock numbers on the WCNF have not changed much since the start of the last planning period in 1985, some activities have helped manage livestock and improve soil and aquatic habitat conditions at specific areas within allotments. In 1996, the Rangeland Health Forest Plan Amendment was completed that established a desired future condition for the rangeland resource and set standards and guidelines necessary to maintain healthy rangeland. Several exclosures have been constructed along riparian areas that have kept livestock from trampling stream banks and have increased the overhanging vegetation along the stream. In the

future, it is expected that additional guidelines will address effects such as stream bank trampling and will reduce adverse effects to soils along stream channels and improve water quality.

Abandoned mine clean up activities has improved soil and water conditions in specific areas on the WCNF and future activities have the potential to improve water quality. On the WCNF, most hard rock mineral development occurred at the head of Big and Little Cottonwood Canyons east of Salt Lake City during the mid to late 1800s and since then, only a small amount of mining work has been done. In Little Cottonwood Canyon since the last planning period began in 1985, old tailings at the Tanners Flat Campground area have been cleaned up and assessment work on zinc sources has been ongoing since 1997, a total maximum daily load (TMDL) has been submitted to the USEPA this year, and projects to reduce zinc loading into Little Cottonwood Creek will begin next year. No hard rock mining development is expected in the near future.

During the last planning period, several oil and gas activities have occurred on the WCNF. A pipeline was constructed across the WCNF east of Bountiful, Utah. Oil and gas exploration and development have occurred on the Evanston and Mt. View Ranger Districts and currently, 19 active wells are on the WCNF. New drilling activities on the WCNF in the past several years has been limited due to the depressed oil market and unavailability of adjacent (unleased) lands that create financial risk. The surge in oil and gas prices since 1999 and the spectre of potential hydrocarbon shortages may renew interest for exploration and development in the area. Past oil and gas exploration and development activities have had a very small impact on soil productivity and water quality. Soil and water conservation practices that were applied to these activities have been very effective in controlling erosion and sedimentation as indicated by streams meeting water quality standards of in these development areas. The largest effect to soil productivity has been the irretrievable commitment of soil resources from road construction and oil pads and, overall, has been a very small portion of the soil resource in the areas of development.

For those streams of the WCNF that are not meeting water quality standards, the WCNF is working with the State of Utah to determine the causes of water quality impairment. The WCNF has been working with the Little Cottonwood Group since 1998 assessing the effects of mining on Little Cottonwood Creek. Field data on water quality, stream morphology, and aquatic health has been collected and a Total Maximum Daily Load (TMDL) assessment is being reviewed by the USEPA. In the Smiths Fork drainage, water quality samples are being collected and stream condition surveys have been completed for the purpose of assessing the quality of water on Forest Service land.

As part of a cooperative monitoring program with the State of Utah, the Forest Service collects water samples in selected drainages and sends them for analysis. Other water quality monitoring activities include macro-invertebrate sampling on selected streams to determine aquatic biological health and stream stability surveys. In addition to this, several cooperative efforts concerned with water quality are ongoing between the WCNF, state and local governments, regional planning agencies, and state colleges and universities.

Areas Adjacent to the WCNF

Lands within the watersheds draining the WCNF have a variety of land use activities. As an example of the types of activities that represent this area, a description of land use is taken from the Utah State Water Plan for the Weber River Basin. The area is diverse in terms of naturally occurring landscapes and land use practices. The high mountain areas are used extensively for a broad variety of outdoor recreational purposes and the production of agricultural crops, livestock, and timber. The upper basin contains six ski resorts, seven major reservoirs, a matrix of cross-country hiking trails, and a number of streams utilized by sport fishermen, rafters and kayakers. Livestock production in the high mountain valleys is limited to dairy and meat producing livestock, mink, and a few fish farms. Irrigated agriculture generally includes varieties of pasture grasses, alfalfa, small grains, some orchard crops and a variety of vegetables (Utah State of 1997a).

With the exception of the Snyderville Basin and Park City Area, populated areas in Summit County generally consist of small rural towns with small commercial businesses. The Snyderville Basin and Park City Area is one of the fastest growing in the state. The area primarily includes residential developments with a high percentage of the populace working in the Salt Lake Valley. The area supports major commercial and industrial concerns including ski resorts, tourism, a major manufacturing business (Utah State of 1997a).

Davis County has highly developed residential, commercial and industrial areas. Several cities have registered significant residential population growth rates in recent years. The northern part of the county supports a number of small family farms, while the southwestern part supports large industries including oil refineries and manufacturing facilities. Northeastern Davis County also supports municipal and residential developments with related small commercial businesses (Utah State of 1997a).

Agricultural is the largest single land use. This includes irrigated and dry cropland, rangeland, and timber production (Utah State of 1997a).

Other than Emigration Creek, there are no streams in the immediate watersheds adjacent to the WCNF that are listed on Utah's 2002 303 (d) list of impaired water bodies. Emigration Creek is listed as impaired for fecal coliform. National Forest System lands are located in the headwaters of Emigration Canyon and older residences are located right next to the stream and many new homes have been built and are continuing to be built in the main part of the canyon. Analysis of fecal coliform pollution problems in Emigration Canyon is expected to begin in 2003 by Salt Lake County through a 319-funded project.

Land Use, Development, Population, and Recreation Trends

In the watersheds that drain the WCNF, land use trends over the last 20 years show that demand for residential and commercial land has consumed agricultural land at a rapid pace, particularly in Salt Lake and Davis Counties where in 1992, agricultural land occupied less than half of the acreage it occupied in 1974 (Utah, State of. 1998a).

Rapid urban expansion is expected in the next 20 years and as open space diminishes pressure to build on the foothills will increase (Utah, State of. 1998a). Private land development is occurring adjacent to the WCNF boundary with high density of housing along the foothills and in some more mountainous areas such as canyons east of Salt Lake City from Emigration Canyon to Little Cottonwood, upper Weber drainage, Woodland, north side of the South Fork Ogden River, Little Bear drainage, west of Bear Lake, near Bear River Service, Meeks Cabin Reservoir.

The population of Utah is expected to increase to 3.3 million in 2020 with 2.5 million living in Davis, Salt Lake, Utah, and Weber Counties. The youth population will continue to be the largest age group in the state (Utah, State of. 1998a).

Motorized recreation is increasing in the state. In 2000, the number of off-highway motorcycles, ATVs, snowmobiles and recreational 4X4s in Utah is estimated at almost 163,000 (Fisher et al. 2001). Technology is continually making improvements to All Terrain Vehicles (ATV), Snowmobiles and Mountain Bikes. ATV's are more powerful, have better suspensions and have better traction than they have ever had before. With lighter frames, better gearing and suspensions, mountain bikers are continually pushing the limits of what and where people can ride.

State and Local Government Water-Related Programs

Several state and local programs control or improve water conditions on lands on or adjacent to the WCNF. The Utah Department of Natural Resources and the Wyoming Water Development Commission identify water development needs, the Utah Nonpoint Source Pollution Management and Drinking Water Source Protection programs control water pollution, coordinate statewide watershed activities, develop source protection guidelines, assess water quality, enforce water quality standard compliance, provide funding for watershed improvement projects, and monitoring. Salt Lake City and Salt Lake County are involved in the management of watershed conditions, water quality, and riparian areas in the canyons east of Salt Lake City and along the Jordan River.

The Utah Department of Natural Resources and the Wyoming Water Development Commission have developed water plans for major basins in Utah and Wyoming. State water plans discuss water development that is planned in the watersheds draining the WCNF. These are construction of conveyance and treatment facilities to deliver water from Willard Bay to the Wasatch Front and construction of a dam on the Bear River west of the Wellsville Mountains (Utah, State of. 2002b). The Jordan River Water Basin Plan states the development of additional water from the Wasatch Range mountain streams but does not identify any specific project (Utah, State of. 1997b). No projects other than existing Central Utah Project will be developed. No additional projects are identified in the Utah Lake Basin Plan (Utah, State of. 1997c) and no projects are identified in the Weber and West Desert basin plans (Utah, State of. 1997a and Utah, State of. 2001c). Water conservation measures are considered in the water plans and include incentive pricing; outdoor watering guidelines and ordinances; landscape guidelines and ordinances; commercial and residential audits; installation of water meters on all water connections; retrofit, rebate, and incentive programs; and leak detection and repair programs would not directly affect

soil and water resources of the WCNF. Wyoming Water Development Commission's Green River Basin and Bear River Basin water plans do not have any on-the-ground projects that are identified for analysis or implementation within the cumulative effects study area and within planning period of the WCNF plan revision (Wyoming, State of. 2001b and Wyoming, State of. 2001c).

One of Utah's key water quality programs is concerned with non-point source pollution control. The mission of the Utah Non-point Source Pollution Management Program is "1) to conserve the waters of the State 2) to protect, maintain, and improve the quality of the waters of the state …3) provide for the prevention abatement, and control of new or existing sources of polluted runoff"(Utah, State of. 2001d). Several Clean Water Act Section 319 funded water quality projects in Utah that are located adjacent to the WCNF have been completed or in progress. These projects include on-the-ground watershed or demonstration projects; information and education projects; and surface and ground water investigations. Several on-the ground projects that are adjacent to the WCNF include Mill Canyon Watershed Project, Emigration Creek Water Quality Study, East Canyon Creek, and the Little Bear River. Several statewide education programs have been funded in part with Section 319 funds. For example, Utah State University has reached many educators and individuals within the state through the USU Statewide NPS Education program.

Another key water quality program is the Utah Drinking Water Source Protection program that protects both ground water and surface water drinking sources. The program uses a watershed approach to assessing and protecting drinking water sources by reviewing potential pollution sources at various scales throughout the watershed in which a water source is located. Because of its proximity to the large population areas near the WCNF, many water sources are located on or adjacent to the forest. Water resources on and off the WCNF are reviewed, protected, and improved by water companies, agencies, and the general public because of the importance of drinking water quality to the nearby communities.

Actions by Salt Lake City and Salt Lake County have protected and enhanced water quality in the canyons east of Salt Lake City through education, signing, enforcement, watershed improvement projects, and monitoring. According to the Salt Lake City Watershed Management Plan (Salt Lake City 1999)" the Salt Lake City Department of Utilities, and other affected jurisdictional parties are seeking to proactively manage this watershed [seven major watersheds to the east of Salt Lake City] by addressing issues that have arisen since the 1988 Watershed Management Plan. …Salt Lake County has adopted master plans for Emigration Canyon (1985), Little Cottonwood Canyon (1973), and the Salt Lake County Wasatch Canyons Master Plan (1989)".

Cumulative Effects Among Alternatives

This section describes the past, present, and future cumulative effects between alternatives on soil productivity, water quality, and water yield. The analysis takes a programmatic look at activities and management on and adjacent to the WCNF and considers general trends, levels of outputs, management controls on activities, standards and guidelines, and practices that minimize adverse affects of activities. The specific effects of activities on soil and water resources have

been described previously under the Watershed Health topic. The analysis looks at short and long-term cumulative effects and irretrievable commitments of soil and water resources.

Soil Productivity

Unwanted wildfire, growing population and residential development adjacent to the WCNF, and increasing recreation use will occur under all alternatives and has the potential to adversely affect soil productivity. All alternatives have about the same potential for unwanted wildfire because the amount of activities that would prevent or reduce wildfire is very low compared to the size of the WCNF. On the WCNF, where unwanted wildland fire results in a potential loss of soil productivity, rehabilitation work will be prescribed to mitigate these effects. Housing developments adjacent to the WCNF bring many more people closer to the Forest and have a higher potential to cause wildfire, use ATVs, and impact soil and water conditions. With a large, young growing population in Utah that is primarily located near the WCNF and technology that is continuing to allow access to land that was previously not used for recreation, recreational demands on the WCNF are expected to increase and a higher potential exists for adverse soil and water effects to occur on the forest. With the increase in OHV and ATV use, soil productivity on and off the WCNF may deteriorate particularly in specific areas where use is concentrated. In the long-term, education, enforcement, and on the ground management on and off the WCNF should help to reduce the adverse effects to soil productivity from these activities.

Short-term adverse effects to soil productivity may occur from most on the ground activities on the WCNF. The WCNF implements soil and water conservation practices that minimize these adverse effects. In reviewing all of the proposed activities and outputs in Table 2-?, Comparison of Alternatives for Projected Activities and Outputs, very little difference occurs between alternatives under Watershed Health, Range Livestock, and Recreation and the short and long-term effects to soil productivity are very little for these proposed activities. Activities and outputs vary substantially between alternatives under Roads and Trails, Oil and Gas Exploration and Development, and Vegetation Treatments. Cumulatively, alternatives 3, 4, and 5 have the greatest potential to affect soil productivity through an irretrievable commitment of soil resources for timber harvest and vegetation treatment road, and oil and gas roads and facilities. Alternative 2 has the highest potential to cause short-term adverse affects to soil productivity because of the large amount of prescribed fire use in aspen and aspen / conifer mixed. Alternative 1 has the least short and long-term cumulative effects on soil productivity because of the small amount of project activities and outputs, and it has the greatest amount of land that is allocated to recommended wilderness and roadless protection where active management is very limited.

When properly implemented, activities such as timber harvest and fire use have very little long-term commitment of soil resource. Only a fraction of those acres affected by timber harvest or fire use will actually suffer detrimental soil impacts such as displacement, compaction, or severe burning. Very few detrimental impacts to soils are expected from timber harvest (excluding roads, skid trails, and landings) and mechanical treatments for fuels reduction because these activities will leave adequate ground cover to protect soils and compaction is limited to a small amount of designated area. The actual amounts of long-term soil resource commitment, and their relation to Forest wide soil quality standards, will be determined on a site-specific basis for

each proposed harvest project. Prescribed fire and wildland fire use will be implemented with soil and water conservation practices. These measures should minimize adverse effects to soil productivity.

New roads represent an irretrievable commitment of soil resources. On the WCNF, the long-term use of roads for new timber harvest and new roads and development for oil and gas activities will occur mainly in the Eastern Uintas Management Area. On lands adjacent to the WCNF in this management area, timber harvest and oil and gas development has occurred in the past and is continuing with activities that may affect soil and water resources such as road building and facility development. The highest potential for adverse cumulative effects to soil and water resources from these activities is in Alternative 5 with Alternatives 3 and 4 somewhat less than this. The lowest amount of irretrievable commitment of soil resources is in Alternative 1.

Under all alternatives, no irreversible effects should occur from the proposed activities because no soil resources are affected where the soil resources cannot be returned to its previous condition.

Water Quality

The short-term effects to water quality are similar to those described in the cumulative effects for soil productivity. This is because ground disturbing activities that have an adverse effect on soil productivity, usually have the potential for adverse effects on water quality, particularly in disturbance area that are close to water bodies. In the short-term, some impacts to water quality may occur from on-the-ground activities on the Forest. Similar to cumulative effects for soil productivity, Alternatives 3, 4, and 5 have the greatest potential to affect water quality because of they have the greatest amount of timber and vegetation treatment roads, and oil and gas roads and facilities. Cumulatively, Alternative 2 has the highest potential to cause short-term adverse affects to water quality because of the large amount of prescribed fire use in aspen and aspen/ conifer mixed vegetation communities. Alternative 1 has the least short and long-term cumulative effects on soil productivity because of the small amount of project activities and outputs, and it has the greatest amount of land that is allocated to recommended wilderness and roadless protection.

In the long term cumulatively, management activities on and off the WCNF should improve water quality through road decommissioning that will reduce erosion and sedimentation; vegetation treatments that will improve ground cover and reduce potential for wildfire; revised grazing guidelines that include bank trampling review during allotment management plan updates and annual operating permit review; and state and local environmental programs that assess water quality and plan actions for the improvement of impaired waters. No irretrievable or commitment of water resources have been identified in any of the alternatives.

Under all alternatives, no irreversible effects should occur from the proposed activities because no water resources are affected where the water resources cannot be returned to its previous condition.

Water Yield

Of the management activities that occur on the WCNF, only Timber Harvest/ Vegetation Treatment activities have the potential to substantially effect water yield. Utah and Wyoming are experiencing an increase in timber harvest on private lands in response to declining sales on public lands. This will cause an increase in water yield from private lands that are harvested. Between alternatives, water yield increase is assumed to be greatest with alternatives 4 and 5, which have the greatest amount of suited lands and would most likely have treatments proposed on them in addition to private land holdings. In all alternatives, most of the water yield increase would occur in the eastern Uintas, north part of the western Uintas, and Bear management areas and in private lands adjacent to these areas.

Topic 1 – Watershed Health

Air Resources

Introduction

This section presents information about air quality conditions; trends; monitoring sites; resource protection measures; and direct, indirect, and cumulative effects to air resources from proposed activities on the WCNF during the planning period.

Laws, Policy, and Direction

- **The Clean Air Act (1967) and amendments to the Act (1972, 1977)** -- Protect and enhance the quality of the Nation's air resources and protect public health and welfare. Section 118 of the Clean Air Act requires that the federal government comply with all federal, state, tribal, interstate, and local air quality standards and requirements (Integration of Air Quality Management into Land Management Planning, pg 1-4). The Act established National Ambient Air Quality Standard (NAAQS) and gave the States primary responsibility for air quality management. States carry out this responsibility through development of a State Implementation Plan (SIP). Federal and State land managers must be certain that their actions comply with all procedural and substantive requirements contained in Federal, State, and local air pollution control regulations (USDA Forest Service. 2000c).

- **The 1977 Clean Air Act Amendment (42 U.S.C.& 7401 et seq) --** Areas of the country were designated as Class I, II, and III air sheds for the prevention of significant deterioration purposes. Class I areas include national parks and wilderness areas designated before 1977 and over 5000 acres in size. Class I provides protection to pristine lands by severely limiting the amount of additional human-caused air pollution that can be added to these areas. There are five Class I areas in Utah: Bryce Canyon, Zion, Arches, Capitol Reef and Canyonlands National Parks. The rest of the state, including Forest Service wilderness areas, is classified as Class II. Presently, there are no haze (visibility) criteria that are enforced in Utah (USDA Forest Service. 2000c).

- **The Wilderness Act (1964) --** Directs the Forest Service to preserve and protect the natural condition of Wilderness, including the intrinsic wilderness value of air quality.

- **The Forest and Range Renewable Resource Act (1973) --** As amended by the National Forest Management Act, directs the Forest Service to "…recognize the fundamental need to protect and, where appropriate, improve the quality of soil, water and air resources."

- **The EPA's Natural Events Policy --** Includes a provision to prevent an area from being designated as "non-attainment" for particulates when high concentrations result from wildfires.

- **The EPA's Interim Air Quality Policy on Wildland and Prescribed Fires** -- Provides guidance on mitigating air pollution impacts caused by wildland and prescribed fires while recognizing the current role of fire in wild-land management.

- **Utah State Smoke Management Plan --** The State of Utah, Division of Air Quality and an interagency workgroup are presently drafting a Utah Smoke Management Plan. Its purpose is "… to identify the responsibilities of the Utah Division of Air Quality (DAQ) and Federal, and State land managers (Land Managers) to coordinate procedures that mitigate the impacts of prescribed fire and wildland fire used for resource benefits on public health, public safety and visibility." This plan is designed to meet the requirements of Title R307, Utah's air quality rules and the policies of the EPA's Interim Air Quality Policy on Wildland and Prescribed Fires. (Utah, State of, 2000c).

Affected Environment

Monitoring Sites

An Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring site is located near Timpanogos National Monument in American Fork Canyon near Orem, Utah.

Qualitative visibility monitoring sites have been in operation on the Ashley NF and WCNF. The Ashley National Forest manages a visibility site near Mill Park in the High Uintas Wilderness area. The WCNF collected visibility data between 1995 and 1997 from two monitoring sites located near the Snowbird top tram terminal. Cameras took photographs to the west toward Salt Lake City and to the south toward Mt. Timpanogos in order to qualitatively assess the visibility across Salt Lake Valley and across the Wasatch Mountains near Salt Lake and Provo, Utah. The WCNF site has not been operating since 1997. These sites give an indication of the haziness of the atmosphere.

Air Quality Conditions

Sources of air pollution occur from activities both on and off the WCNF. Impacts to air quality on the Forest include regional haze, caused by transported pollutants from large urban areas adjacent to the Forest, including industry and manufacturing, traffic, and wood-burning stoves. Localized air pollution occurs from heavy traffic during peak hours and from skiers driving to resorts in Big and Little Cottonwood Canyons in the winter months. Air pollutants of concern include fine particulate matter, nitrogen oxides, sulfates, and carbon monoxide. These pollutants can affect human health, reduce visibility, and can lead to acidic deposition in high-elevation lakes.

Most lands managed by the Forest currently are in attainment of national ambient air quality standards (NAAQS). Part of the Salt Lake Ranger District is in non-attainment areas for PM 10 (particulate matter less than 10 microns in diameter), sulfur dioxide, and ozone. Salt Lake County is a non-attainment area for PM 10, sulfur dioxide, and ozone. Davis County is a non-attainment area for PM 10 (Utah, State of. 2000d). Land-use practices within or adjacent to this

non-attainment area are closely scrutinized by local and state regulatory agencies to ensure that further violations do not occur.

A visibility-monitoring site is located in American Fork Canyon that represents conditions near the Lone Peak Wilderness. The site has collected data (Copeland et. al. 2001) since 1993 and complete seasonal data is available for three years from 1996-98. Interpretations are made from 1996-98 since data is complete for each season during this period. Information on current and natural visibility conditions is from a newsletter about the interagency IMPROVE visibility-monitoring program (Malm, et. al. 1994).

Information from the site shows that winter season has greatest extremes in visibility where it has the cleanest of the "clean" days (average about 120 miles) and the dirtiest of the "dirty" days (average about 38 miles). The cleanest of the "clean" days is above the estimated natural mean visibility in the West, which is 110-115 miles. In comparing winter to other seasons, poor visibility for the dirtiest 20% of days is attributed in the most part to increases in nitrates and sulfates. The visibility of the mean of the median 20% of days in 1997-98 showed very little difference between each season. Average annual visibility for 1996-98 of the mean of the median 20% of days is about 75 miles and is less than the best current mean visibility in the inner mountain west and Great Basin regions which is 90 miles.

Future Trends

Sources of air pollution on the WCNF are both local and regional. As population increases in northern Utah, air quality effects are expected to increase. Locally, some air quality impacts are expected due to increased development of ski resorts and ancillary effects of increased traffic and residential development in the canyons along the Wasatch Front. Regionally and locally, smoke impacts from prescribed burns are expected to increase as attempts are made to reduce fuel loading. Specific impacts include reduced visibility as well as short-term increases in the concentration of particulate matter in communities downwind of a burn. Under wildfire conditions high fuel consumption often creates high particulate outputs.

Resource Protection Measures

The conformity regulations promulgated by the EPA in 1994 specifically require federal compliance with the Clean Air Act. Forest management activities must therefore be analyzed for their potential air quality impacts and these must be mitigated if necessary.

A cooperative effort called the Utah Smoke Management Program is established between the Utah Department of Air Quality (UDAQ) and agencies that are involved in the use of prescribed fire and wildland fire use. As part of this program, a Utah Smoke Management Plan (SMP) is developed to coordinate procedures that mitigate the impacts of prescribed fire and wildland fire use for resource benefits on public health, public safety and visibility. State and Federal agencies have signed an MOU that commits the signatories to voluntarily abide by the smoke management plan and are members of the Utah Airshed Group that provides overall management direction and guidance by functioning as an interagency steering committee to ensure appropriate implementation of the SMP (Utah, State of. 2000c).

Direction in the Utah Smoke Management Plan provides for organization and operating procedures, prescribed fire and wildland fire requirements, and program management. Under prescribed fire, several items are required including an annual burn schedule, prescribed fire burn plans, burn request form, implementation of emission reduction and dispersion techniques, a daily emission report form, surveillance and enforcement by UDAQ staff, and monitoring (Utah, State of. 2000c). Similar requirements are expected for wildland fire use.

Environmental Consequences

Effects on Air Quality from Fire Management

Direct and Indirect Effects

The main effect to air quality from activities on the WCNF is the introduction of smoke and particulates into the air from fire management activities. The WCNF uses prescribed fire and wildland fire use for fuels reduction and resource benefits by managing a fire that is within a prescription. Wildland fire use differs from prescribed fire in that wild land fire use is a result of a lightning ignition, where prescribed fires are started by fire management personnel. Unwanted wildland fire is fire that is not within prescription and is managed under a suppression strategy.

Alternative 1 would have the least effect to air quality from prescribed fire since its use is not allowed. Alternatives 3, 6, *and 7* are expected to have similar effects to air quality from prescribed fire between these alternatives since all of these alternatives would have about *12,000 to* 13,500 acres of prescribed fire per year. Alternative 2 is expected to have more effect to air quality than Alternatives 3, 6, *or 7* since prescribed fire would be used on about 23,000 acres per year, which is almost twice as much as Alternatives 3, 6, *or 7*. Alternatives 4 and 5 would have the least potential for smoke using prescribed fire since the predicted area of treatment is about 5,400 acres per year.

In all alternatives, unwanted wildland fire has the potential to cause a large amount of smoke. There is a trade-off between smoke generated by unwanted wildland fire and prescribed fire and wild land fire use, in that, when using prescribed fire *or wildland fire use* smoke would be generated under *more* controlled conditions and mitigated while smoke generated by unwanted wildfire could be much greater and unmitigated. The prescribed fire use and vegetation treatments in Alternatives 2, 3, 5, 6, *and 7* would help to reduce the potential for unwanted wildland fire, particularly in oak vegetative communities, and should reduce smoke that would develop under uncontrolled conditions. When using prescribed fire or wildland fire use, smoke dispersal is taken into consideration in the fire plan. Prescribed fire and wildland fire use activities occur during the time of the year when it is less likely to have temperature inversions. Air quality conditions that occur in the valleys during the winter season inversions will not be present when prescribed fire or wildland fire use is implemented.

Effects on Air Quality from Ski Resort Management

From years 1997 to 2001, ski area master development plan (MDP) final environmental impact statements (FEISs) were written for Alta (USFS 1997), Snowbird (USFS 1999e), Brighton (USFS 1999d), and Solitude (USFS 2001h) ski resorts. These reports analyzed the effects of ski area development on air quality and included the direct, indirect and cumulative effects of proposed activities at the ski resorts and emissions from vehicles that drive in Big and Little Cottonwood canyons and the main roads that lead to them. The results of these analyses indicate that (1) air quality impacts are minor when compared to indirect emissions under baseline conditions; (2) air quality is in compliance with the General Conformity thresholds for ozone (volatile organic carbon emissions), ozone (nitric oxides), PM_{10} (particulate matter), and sulfur dioxide; and (3) selected alternatives in the FEISs do not cause an exceedance of any National Ambient Air Quality Standard.

A main decision that the Forest Plan Revision will make is whether to allow expansion of ski resort boundaries. The effect on air quality from expansion of ski resort boundaries is complicated because of several factors. The expansion of ski area permit boundaries may decrease air quality due to increases in emissions from vehicles using the roads leading to the resorts. The increase in use of the ski areas would be a result of encouraging more visitors to the resort because of the larger facilities and terrain available. Since parking on federal land is limited to existing parking area, the potential increase may occur in more days when the number of vehicles approach the canyon travel capacity, than in the number vehicles in the canyon on the peak days.

Air quality is not expected to decrease in Alternatives 1, 2, 3, 6, and 7, since no expansion of permit boundaries is allowed. Air quality may decease in Alternatives 4 and 5 since ski area permit boundary changes are allowed in Alternative 5 and are considered and decided through master development planning and other analyses in Alternative 4. Although air quality may decrease on more days, it would not be expected to exceed the General Conformity based on the results of latest ski resort master development plan air quality analyses. The latest MDPs for the Big and Little Cottonwood ski resorts have recognized that air quality is a concern particularly at the mouths of the canyons and that traffic going to the resorts need to be managed. Management of traffic such as additional parking for mass transit may reduce vehicle use on roads leading to the canyons nullifying the concern of decreased air quality due to expansion of ski area permit boundaries.

Effects on Air Quality from Snowmobiles

An issue that has gained more attention in recent years is the effects of 2-stroke engines on air quality. As snowmobiling has gained in popularity over the last 20 years, the concerns related to effects of snowmobiles on air quality has increased. Snowmobile use on the Wasatch-Cache National Forest has increased proportionately to the increases in other locations.

There have not been any studies done specific to the Wasatch-Cache National Forest to determine the effects of snowmobiling on air quality. A number of studies of the effects of

snowmobiling on air quality were done as part of the "Winter Use Plans Final Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and John D. Rockefeller, Jr. Memorial Parkway" (Winter Use Plans FEIS), (USDI National Park Service 2000) (http://www.nps.gov/planning/yell/winterfinal/frames.htm). Although many of the studies were specific to that area, they have some applicability to effects of snowmobiling on the Forest. Following is a summary of analysis of air quality presented in the Yellowstone FEIS and a comparison of snowmobile use levels between Yellowstone and the Forest.

The Federal Clean Air Act, as amended in 1990, requires the Environmental Protection Agency (EPA) to establish national ambient air quality standards (NAAQS) to protect public health and welfare. Standards have been set for six pollutants: particulate matter less than 10 microns (PM_{10}), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), ozone (O_3), and lead (Pb). These pollutants are called criteria pollutants because the standards satisfy criteria specified in the act. The areas covered by the three park units are in attainment of ambient air quality standards. (USDI National Park Service 2000)

A particulate sampling station operated by the Montana Department of Environmental Quality is located outside Yellowstone National Park (YNP) in the town of West Yellowstone. As reported in the aerometric information retrieval system (AIRS), the second highest CO 8-hour average in 1999 was 5.0 parts per million (ppm), and the corresponding average in 1998 was 3.6 ppm **(**http://www.epa.gov/air/data/index.html**)**. These compare to the federal and Montana CO 8-hour ambient air quality standards of 9.0 ppm. At the West Yellowstone monitor, the highest 24-hour PM_{10} measurement in 1999 was 61 $\mu g/m^3$, and the corresponding measurement in 1998 was 40 $\mu g/m^3$. These compare to the 24-hour 150 $\mu g/m^3$ federal and Montana PM_{10} ambient air quality standards. (USDI National Park Service 2000)

To assess the relative impacts of the proposed winter use alternatives on ambient air quality in the Greater Yellowstone Area, short-term air quality analyses were performed by means of atmospheric dispersion modeling for carbon monoxide (CO) and particulate matter (PM_{10}). The air quality study includes the inherent uncertainties of the model and the temporal and spatial biases due to limited meteorological and emission data. The following table displays air quality data predicted at high use locations in YNP for current use in YNP:

Table AIR-1: Yellowstone Air Quality Predictions

Pollutants Modeled	**West Yellowstone Entrance**	**West Entrance To Madison Roadway Corridor (14 Miles)**	**Old Faithful Staging Area**	**Federal Primary Ambient Air Quality Standards**
Maximum 1-hr CO concentrations[1]	32.2 ppm	14.8 ppm	4.29 ppm	35 ppm
Maximum 8-hr average CO concentrations[2]	15.15 ppm	6.96 pm	1.62 ppm	9 ppm
Maximum 24-hr ave. PM_{10} concentrations[3]	68.19 $\mu g/m^3$	33.74 $\mu g/m^3$	5.64 $\mu g/m^3$	150 $\mu g/m^3$

[1] Prediction of parts per million of carbon monoxide based on EPA air quality models and including background CO levels.
[2] Estimated from the modeled maximum 1-hour average concentration of CO based on a persistence formula.
[3] Modeled micrograms of respirable particulates less than 10 microns in size per cubic meter including background levels.

The modeling done for the above table was based on a substantial amount of collected data. The research was reviewed in a report prepared for the State of Wyoming Institute for Environment and Natural Resources and titled "Review of Research Related to the Environmental Impact Statement for the Yellowstone and Grand Teton National Parks and the John D. Rockefeller, Jr. Memorial Parkway" (2000) prepared by the University of Wyoming Institute for Environment and Cultural Resources. The authors of the review disputed the accuracy of the assessment of air quality based on methodological issues, but agreed that there is a genuine air quality problem. They stated that more monitoring and modeling is required.

The YNP Final Environmental Impact Statement (FEIS) concluded that based on previous studies and the results of air dispersion modeling conducted for this analysis, short-term, adverse impacts at the West Entrance would continue at times, during high winter use days.

The highest potential for air pollution from snowmobiles on the Wasatch-Cache National Forest occurs at the Bear River Snowpark on The Evanston/Mountain View District, the Soapstone Basin Parking area on the Kamas District and the Tony Grove and Franklin Basin parking areas on the Logan District. A comparison of the estimated use on the Wasatch-Cache National Forest and known use in YNP indicates the following:

- Estimated total snowmobile use on Forest is less than the total use in YNP.
- Estimated snowmobile use at any one of the most concentrated spots (Bear River Snowpark, Soapstone Basin, Tony Grove and Franklin Basin) on the Forest is significantly less that the use at the most concentrated spot (West Yellowstone Entrance) in Yellowstone (YNP).

Following are differences between snowmobile use on the Forest in comparison with YNP:

- Snowmobiles are not restricted to roads on any Districts. They are restricted to designated roads in YNP.
- Traffic from the West Yellowstone Entrance proceeds on a single 14 mile route to Madison Junction while traffic out of each of these parking lots is in at least two directions, Bear River Snowpark for example goes in 2 directions (about 1/3 heading east on the north slope road and 2/3 heading south on the Mirror Lake Highway) and then splits again within 2 or 3 miles going in either direction.
- Snowmobiles idle, stop and start numerous times waiting in line at entrance booths at West Yellowstone. Snowmobiles at the trailheads on the WCNF are generally unloaded, run up and down the parking lot several times to warm up engines and then turned off while operators get their gear together. They then leave the lot without stopping.

In YNP, air quality samples were collected in accordance with EPA protocol and did not exceed Federal ambient air quality standards. The exceedance predicted for some high use days at West Yellowstone was based on modeling. Based on the above estimates of use and differences in operations, and the intensive data collection and monitoring done at YNP, it is unlikely that snowmobiles would cause a violation of Federal Primary Ambient Air Quality Standards on the Wasatch-Cache National Forest at current use levels. The trend in use has been increasing but it

is unlikely that ambient air quality standards would be exceeded on the Wasatch-Cache National Forest under any of the Alternatives in the foreseeable future.

Cumulative Effects

Analysis Area and Area of Influence

The analysis area and area of influence is the airshed in northeast Utah and Southeast Wyoming.

Reasonably Foreseeable Actions

Effects from actions can be cumulative, both spatially and temporally. Cumulative effects to air quality can occur from Forest Service management activities and activities occurring on state, tribal, and private lands. Smoke emissions from fire use, in combination with urban sources along the Wasatch Front, other out-of-state sources and stagnant meteorological conditions, have the potential to cause relatively short durations of conditions not meeting State Air Quality standards. However, this is not anticipated with activities being coordinated through the Utah Airshed Group and requirements of the Utah Smoke Management Plan.

The Clean Air Act authorizes EPA to protect visibility through a number of programs. In 1987, the Interagency Monitoring of Protected Visual Environments (IMPROVE) visibility-monitoring network was established as a cooperative effort between EPA, USDA Forest Service, BLM, National Park Service, US Fish and Wildlife Service, and state governments. Monitoring results from this network have shown that, in general, visibility is improving in the West and is much better than in the East. From 1992 to 1998, PM 2.5 levels in rural areas in the western U.S. decreased by 5 percent (US EPA 2000). Coordination of air quality impacts through the Utah Airshed Group is expected to improve visibility and reduce public concerns in Utah and down-wind airsheds and communities.

Topic 2 – Biodiversity and Viability

Vegetation

Introduction

The following sections provide broad descriptions of the vegetation cover types, and disturbance ecology, followed by landscape vegetation patterns for the Wasatch-Cache National Forest. Because of differences from one mountain range to another, the discussion has been organized into information for each of three ecological sections (Uinta Mountains, Overthrust Mountains, and Bonneville Basin) in which the Wasatch-Cache National Forest occurs (Figure VEG-1). Table VEG-1 lists estimated acreage of each cover type (rounded to the nearest 100 acres) currently mapped on the Wasatch-Cache National Forest portions of each ecological section.

Figure VEG-1 – Location of the Wasatch-Cache National Forest within the Bonneville Basin, Overthrust Mountains, and Uinta Mountains Ecological Sections.

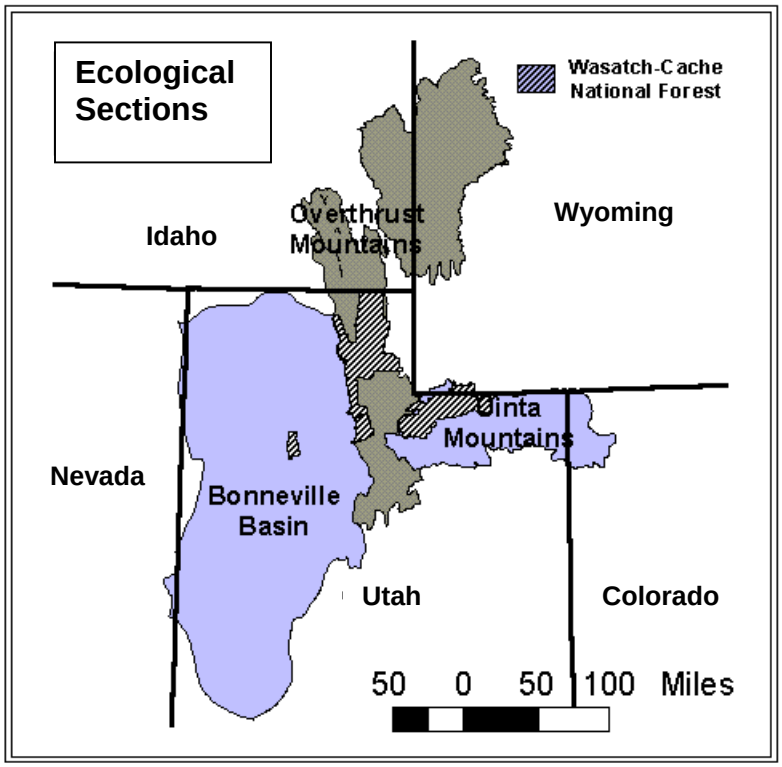


Table VEG-1. Acres of each vegetation type within the Wasatch-Cache National Forest portions of the Uinta Mountains, Overthrust Mountains, and Bonneville Basin Ecological Sections. Percentages are for each cover type within the Wasatch-Cache portion of those ecological sections and for total forest-wide area.

Cover Type	Overthrust Mountains Section	Percent within Overthrust Mountains	Uinta Mountains Section	Percent within Uinta Mts	Bonneville Basin Section (Stansbury Range Only)	Percent within Stansbury Range	Total Forest-wide	Percent of Total
Alpine	1,400	0.2	17,700	3	600	0.9	19,700	1.6
Barren[1]	21,100	3.7	79,900	13.7	500	0.7	101,500	8.3
Limber Pine	11,500	2	0	0	0	0	11,500	0.9
Spruce-Fir	24,600	4.3	127,600	21.8	1,200	1.7	153,400	12.5
Mixed Conifer	16,000	2.8	135,700	23.2	0	0	151,700	12.3
Lodgepole Pine	8,200	1.4	53,100	9.1	0	0	61,300	5
Conifer-Aspen	23,400	4.1	23,600	4	0	0	47,000	3.8
Aspen-Conifer	21,800	3.8	34,000	5.8	0	0	55,800	4.5
Aspen	74,100	12.9	27,000	4.6	1,700	2.5	102,800	8.4
Douglas-fir	70,000	12.2	8,500	1.5	9,100	13.3	87,600	7.1
Ponderosa Pine	0	0	500	0.1	0	0	500	0
Bigtooth Maple	14,600	2.5	0	0	0	0	14,600	1.2
Gambel Oak	88,700	15.4	2,100	0.4	0	0	90,800	7.4
Tall Shrub	15,700	2.7	300	0.1	6,100	8.9	22,100	1.8
Mahogany	12,800	2.2	900	0.2	100	0.1	13,800	1.1
Juniper, Pinyon-Juniper	43000	7.5	700	0.1	33,200	48.4	76,900	6.3
Sagebrush/ Grasslands	122,100	21.2	51,800	8.9	15,700	22.9	189,600	15.4
Tall Forb	3,200	0.6	0	0	0	0	3,200	0.3
Bottomland Hardwood	2,800	0.5	300	0.1	400	0.6	3,500	0.3
Wet Meadow	100	0	16,800	2.9	0	0	16,900	1.4
Willow	800	0.1	3,600	0.6	0	0	4,400	0.4
Total	575,900	100	584,100	100	68,600	100	1,228,600	100

[1] "Barren" areas in the Uinta Mountains occur in the upper cirque basins in and below the alpine. Some have scattered vegetation and could more appropriately be included in the Alpine cover type.

Vegetation patterns (both distribution of cover types and the age class diversity within these types) in the three ecological sections of the Wasatch-Cache National Forest are a function of numerous factors. Geology, soil characteristics, elevation (temperature) and precipitation are among the factors that affect the occurrence of cover types across the landscapes. Natural succession and disturbance factors, as well as human-induced disturbance such as prescribed fire, timber harvest, livestock grazing, development, and other actions can affect the extent of cover types, and often affect the age class diversity within each cover type on the landscapes. The Uinta Mountains (Uinta Mountain Section) and the Stansbury Mountains (Bonneville Basin Section) are geologically less diverse than the Wasatch Mountains, including the Bear River and Wasatch Ranges (Overthrust Mountains Section). In addition, precipitation patterns are more variable within the Wasatch Mountains because of the common "lake effect" from storms

moving across the Great Salt Lake and dropping more water, often in the form of snow, in areas primarily to the east and southeast of the lake. Both of these factors cause the Wasatch Mountains to have a much greater diversity in vegetation patterns than one finds elsewhere on the Forest.

The following descriptions show that vegetation rather than being a static covering of the land is instead an extremely dynamic patchwork with various cover types and age classes continually changing into and out of each other. This can create a rich mosaic of species (composition), age classes (structure), and distributions (pattern) of plant communities across the landscape. The result is a very complex, ever-changing three-dimensional "blanket" with different "ecological functioning" depending on the whole, as well as the parts. Ecological functioning is the value of the blanket in providing for essential life processes such as watershed protection, water and nutrient cycling, soil building, habitats for wildlife, from birds and big game to fish, insects, and even microbiotic communities. This blanket is also a major part of what we enjoy as scenery.

The last part of this section provides an assessment in summary form, of the status of vegetation types with regard to properly functioning ecosystem conditions and risks related to current status. Appendix B-1 contains a description of how vegetation modeling was conducted for forest planning.

Laws, Policy, and Direction

- **National Forest Management Act, 1976.** This law states that forest plans must "provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area."
- **Ecosystem Management** - In 1992, the Chief of the Forest Service issued a statement committing the Forest Service to the practice of ecosystem management, which is an ecological approach to managing national forests and grasslands for multiple uses.
- **36 CFR 219.27(g)** states that management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities.
- **36 CFR 219.19** requires the Forest Service to identify and prevent the destruction or adverse modification of habitat determined to be critical for threatened and endangered species. It states that fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species. Viable populations are defined as those with sufficient numbers and distribution of reproductive individuals to ensure their continued existence in the planning area.
- **36 CFR 219.19** (**a)** also directs the Forest Service to select Management Indicator Species (MIS) to estimate the effect each alternative has on fish and wildlife habitat and its subsequent effect on wildlife populations, vegetation communities, and other ecological components; consult with biologists from other agencies; Consider access and dispersal problems of hunting, fishing, and other uses; and, Evaluate the effects of pest and fire management and the population trends of selected MIS.

Affected Environment

Disturbance Ecology and Ecosystem Resiliency

Hunter (1990) related a basic assumption that "the most efficient way to maintain biological diversity in a forested landscape is to have a diverse array of stands and thus a diverse array of ecosystems and their constituent species." We assume that non-forested landscapes would follow the same connection as well. Tilman (2000) found that, in general, greater diversity results in "greater productivity in plant communities, greater nutrient retention in ecosystems and greater ecosystem stability." Currently, diversity on the Wasatch-Cache National Forest is less that occurred historically. Disturbance once played a much more significant role in the diversity of age classes, patterns, and acres of different types. Natural disturbances such as fires, floods, etc. were more frequent, perhaps, but because they were, their intensity was less than is seen in ecosystems today. Forested ecosystems, such as the aspen and lodgepole types, were perpetuated through regular disturbance (fire). Fire suppression has reduced the amount of the aspen type over what occurred on the Wasatch-Cache National Forest historically by approximately 65 percent (O'Brien and Pope 1997) and the age class and fuels of the lodgepole type have been altered as well. As a result, the resiliency of these ecosystems and their function has been reduced. Mangel and others (1996) noted that the maintenance of biological diversity at the ecosystem, population, species, and genetic levels will help secure options for the future and that within the "natural boundaries of variation," resources will be conserved. Ecosystem resilience has bee reduce on the Forest because biodiversity at the ecosystem level has been reduced through a loss of diversity in age classes and the distribution of age classes within vegetation community types (patterns), as well as a significant reduction of certain types, such as aspen vegetation communities.

A variety of insects and diseases are associated including Douglas-fir beetle, Douglas-fir tussock moth, and dwarf mistletoe. A Douglas-fir beetle (*Dendroctonus pseudotsugae*) outbreak was noted in 2000 on the Wasatch-Cache National Forest (USDA Forest Service 2002c). The extent of this outbreak was not identified, but it was noted that for the Intermountain Region (Utah, Nevada, southern Idaho, and western Wyoming) mortality from Douglas-fir beetle was static between 1999 and 2000. These authors noted that mountain pine beetle (*Dendroctonus ponderosae*) nearly quadrupled between 1998 and 2000 in the Intermountain Region and that it increased in lodgepole pine stands on the Wasatch-Cache National Forest. In the Bear River Range, the scattered nature of these lodgepole stands creates a situation where risks of insects and disease are reduced so this has not been a major factor in shaping the stands, but the nearly continuous stands of lodgepole and mixed conifer (with lodgepole a major component) in the Uinta Mountains is highly susceptible.

The gypsy moth (*Lymantria dispar*) was first detected in Utah (along the Wasatch Front) in 1998 and between 1989 and 1993 nearly 72,000 acres of Federal, State and private lands were treated with *Bacillus thuringiensis* (Bt) (USDA Forest Service 2002c). In 1995 the moth was declared eradicated, but in 1997 one moth was found using pheromone traps in the same vicinity on the Wasatch-Cache National Forest, and 46 moths were captured on adjacent lands. Over 750 acres were treated in 1999 in Salt Lake County. It is expected that treatments for gypsy moth using Bt will continue indefinitely, because of continued moths being introduced to the area.

Broad Scale North-South Coniferous Corridor

A description of vegetation cover in the Wasatch-Cache National Forest would be incomplete without mention of the regionally significant forestland "wildlife corridor". This north-south linkage between large landscapes is evident when viewing maps of the ecological subregions of United States (McNab and Avers. 1994). The corridor connecting forests from the northern Rocky Mountains in Canada to the southern Rocky Mountains has its narrowest part through the Wasatch-Cache National Forest in northern Utah. This linkage provides for sustaining biological diversity from the potential for exchange of genetic materials within species to the potential for migration of entire populations and communities as environmental conditions change (Primack, 1993: 339) Vegetation and ecological conditions within the National Forest are even more important when viewed in the context of other land ownerships that are increasingly being developed or managed for non-wildland purposes.

Wasatch Mountains (Wasatch, Bear River and Wellsville Ranges)

Vegetation Cover Types and Disturbance Regimes

Alpine: This vegetation group is characterized by patchy (not generally turf-forming) vegetation with thin to nonexistent soils with rocky outcrops, fell-fields and boulders. Native perennial plant cover includes short meadow forbs, sedges and grasses, some low shrubs, and lichens and bryophytes. These are sensitive to even slight disturbance because recovery is very slow within this harsh environment.

Limber Pine: These open plant communities are a minor but unique component of the Wasatch Mountains. These stands are dominated by Limber pine, which is mostly mature with some younger individuals scattered among older trees. Sites supporting this type usually have shallow, rocky soils. Canopies do not close and trees are distributed in sparse stands or widely spaced clumps of trees. In the northern Wasatch Mountains Douglas-fir is present within Limber pine stands while in the south both Douglas-fir and Engelmann spruce are intermixed. Fire regime is mixed severity with 100 to 150 year intervals between stand-replacing fires.

Engelmann Spruce-Subalpine Fir: Varying combinations of subalpine fir and Engelmann spruce with aspen as an important seral species make up this category. The spruce is long-lived (often exceeding 300 years), but susceptible to wind-throw (resulting in spruce beetle epidemics) while subalpine fir is shorter lived (100-150 years) and less disease resistant. Most stands have a multi-canopy structural condition, although much of the regeneration is subalpine fir, which is more shade tolerant. Historically, small fires (1/4 to a few acres) occurred regularly in this type either killing or weakening trees in these small areas. Large fires (a few to several hundred acres) every 200-300 years were common because of a combination of insect epidemics and fuel buildup. For the past 100 years fire suppression has allowed a buildup of fuels and higher stand densities which cause insect activity to be more extensive and intense than characteristic historically. Beetle kill is potentially very high and it has been 200-300 years in most stands since the last large fires occurred. These conditions provide potential for larger areas (several hundred to a thousand or more) to be burned at one time and the higher accumulations of large

woody debris and ladder fuels create conditions conducive to more intense fires outside the historical range.

Subalpine fir: This vegetation type occurs primarily in the Bear River Range. Stands are co-dominated by pure subalpine fir or a mixture of subalpine fir with Douglas-fir. Aspen is a major seral species, which is being replaced by subalpine fir in many areas. Subalpine fir is shorter lived (100-150 years) and less disease resistant than Engelmann spruce. Fire historically played an important role in these stands with replacement fires occurring on a 100 to 300 year cycle. Root disease is common and balsam bark beetle is at epidemic levels in the Wasatch Mountains. Currently many areas are dominated by mature to old age classes with fire suppression resulting in high stand densities and basal area along with ladder fuels, which could result in larger more intense fires than occurred historically.

Mixed Conifer: The Bear River mixed conifer communities occur at mid to high elevations in the Bear River Range east of Cache Valley and Ogden Valley. They are somewhat unique in their overstory dominance of subalpine fir, with or without Douglas-fir and lodgepole pine. Occasionally limber pine occurs as scattered individuals near the Sinks area of the Bear River Range. This type is generally at transition between the high elevation spruce-fir communities and the Douglas-fir or lodgepole pine communities at mid or lower elevations.

Lodgepole pine: Only a small amount of this cover type occurs within the Wasatch Mountains, and it does not grow in the classic large monocultures covering thousands of acres such as in Yellowstone or the Uinta Mountains. Instead, lodgepole here (primarily on the east side in the "Bear Management Area") grows in smaller non-contiguous stands along north facing slopes of ridges often intermixed with other conifers such as subalpine fir and spruce. Historically, these probably burned with stand replacing fires on a 150-300 year cycle, which in recent times have been suppressed. These areas were heavily logged in the 1880's and again since 1960. Early logging slash piles were burned causing general larger stand replacement fires over much of the area. The scattered nature of these lodgepole stands creates a situation where risks of insects and disease are reduced so this has not been a major factor in shaping the stands. However, stand structure has been altered as a result of logging with current stands grouped primarily in the over 60-70 years old class or in the under 20-30 years class.

Aspen: The aspen vegetation type may occur on sites that can be succeeded by conifers (seral aspen), or it can occur on drier sites incapable of supporting conifer communities (stable or climax aspen). On most sites, aspen is an important early seral species in the spruce-fir, mixed conifer, lodgepole, and Douglas-fir vegetation types and in the Wasatch Mountains, studies show that much of the historic seral aspen has now been replaced by spruce-fir, lodgepole pine, and Douglas-fir (O'Brien and Pope 1997). Historically, the aspen vegetation type may have covered nearly 20 percent of these mountains, but today it occupies less than 13 percent. Aspen relies on disturbance for sprouting and regeneration, which has been reduce through fire suppression actions over the past 50-100 years. These two types of aspen (seral and climax) are distinct for purposes of assessing ecological conditions and trends. **Seral aspen** historically was disturbed by fire maintaining patterns and structural diversity across the landscape. Patchy, low-intensity fires at lower elevations, and more extensive stand replacement fires at higher elevations historically regenerated aspen and kept conifers from replacing aspen stands. An estimated 75-

80 percent of the aspen is now in mid-age, mature, and old-age condition. Together, fire suppression and livestock grazing (reductions in fine fuels) have combined to result in fewer fire starts and generally smaller fires in this type. Historically the fire regime was lethal fire burning on a 20 to 100 year cycle. Aspen regeneration after fire or cutting is often susceptible to browsing by wild and domestic ungulates, which can result in unsuccessful regeneration. This is especially true if the area treated is small (such as a stand) rather than across an entire landscape (multiple stands). **Climax aspen** is much less common than seral, often at the fringe of where seral aspen communities occur and adjacent to sagebrush-dominated rangelands. Present tree ages vary from 60 to 150 years. Historically, patchy, low-intensity fire at lower elevations and more extensive stand replacement fires at higher elevations were the most important disturbance factor maintaining structural diversity of this type across the landscape. High levels of grazing in this type in the past have resulted in reduced fuels to carry fire and changed species composition and dominance (western coneflower is a good example of this).

White fir: This cover type has not been mapped on the Forest, but occurs in minor amounts along the lower, western portion of the Wasatch Mountains on steep north-facing slopes. It is not known in the Cache-Box Elder or Bear Management Areas, except for an isolated stand near Logan Canyon. Minor amounts of Douglas-fir and aspen can be present mixed with the predominant white fir. White fir is shade tolerant growing well in very dense conditions. Thus, in the absence of low-intensity fires, it increases, eventually dominating even in stands that are currently dominated by seral big-tooth maple and/or oak-maple. Because of the very dense, multi-layered canopy conditions, defoliators such as western spruce budworm and Douglas-fir tussock moth are accommodated resulting in significant tree mortality (40-90%) in many stands. Fir engraver beetle is at epidemic levels throughout the Wasatch Mountains from Ogden south. The historical fire cycle was non-lethal fires every 10-40 years on drier sites and every 30-60 years on wetter sites. Some stand replacing fires, especially where Douglas-fir was seral, kept the white fir structure at younger stages. Fires are suppressed especially given the proximity of these stands to urban populations. Lack of the frequent, low intensity fires during the last 100 years has created an accumulation of fuel, resulting in potential for fires to be more intense stand replacing fires rather than the white fir thinning fires of the past. White fir of 150+ years develops fire resistant bark similar to Douglas-fir. Currently 60-75 percent of white fir is mature and old with a trend toward mortality exceeding growth.

Interior Douglas-fir: This type is restricted to steep north-facing slopes, but is adapted to a wide variety of site, climate, and soil conditions. Historical stand structures were primarily even-aged, single canopy with fire regimes usually non-lethal on a 10 to 25 year frequency on drier sites and 30 to 50 years on cooler/wetter sites. Most stands have not burned in the last 100 years increasing ladder fuels and susceptibility to stand replacement fires. In many stands that were selectively harvested in early 1900's Douglas-fir did not regenerate and the stands are now dominated by white fir. Douglas-fir beetle is at near-epidemic levels to the south and about 55-60 percent is susceptible. Dwarf mistletoe also is present but more common to the south. Large stand-replacing fires or continued exclusion of frequent non-lethal fires result in compromising the historical balance of patterns and structures in these landscapes.

Juniper (Pinyon-Juniper): This cover type with pinyon pine occurs only on sites where precipitation exceeds 18 inches annually. Both Utah juniper and Rocky Mountain juniper forms

make up this type with Utah juniper growing on the relatively drier sites. Pinyons occur within the Mollens Hollow Research Natural Area, but are generally absent elsewhere. The juniper type currently exceeds historical distribution expanding into oak, mountain brush, and sagebrush communities. It is also much denser within a stand than historically as a result of livestock grazing of fine fuels concomitant with fire suppression and juniper's allelopathic effects. The result is lack of understory vegetation for soil protection and deteriorated watershed conditions. Historically, this type was restricted to "fire safe" sites (fire return interval greater than 10-30 years) while it was excluded from establishing on sites with fire returns of 10 to 30 years. The rooting system and year-round water use result in significant impacts to ground water and aquifer recharge. Fire regimes have changed because of lack of fine fuels but large fires can occur as wind-driven crown fires. The change from low-intensity surface fires to snag-replacing crown fires demonstrates a radical change in fire regime. In other areas, an increase of exotic annuals such as cheatgrass has enabled fires to burn more frequently than historically, and native herbaceous understories are replaced by weedy species such as cheatgrass, thistle, and knapweeds.

Mountain Mahogany: This cover type occurs with two different species: - curl-leaf and birch leaf mountain mahogany. Birch leaf mountain mahogany is deciduous and sprouts following fire or browsing while curl leaf mahogany is evergreen, tree-like and reproduces only by seed. Wildlife and livestock browse both and where use is heavy, reduced soil cover results in some decline in watershed condition. Birch leaf mahogany on southerly aspects where wild ungulate winter use is heavy may be lost.

Gambel Oak: This cover type occupies more than 15 percent of the Wasatch-Cache National Forest portion of the Overthrust Mountains Ecological Section. It occurs on foothills, along the Wasatch Front, but is absent, except for one isolated stand near Logan Canyon, from the Cache Valley area. Oak is a prolific sprouter that occurs in tree form on better sites and in a medium to tall shrub form elsewhere. The massive root system holds soils well for watershed protection and until overstories become dense, stands may support abundant understory grasses and forbs. Fire intervals were historically 20 to 50 years and years of fire suppression have resulted in somewhat greater than historical patch size and large areas of old decadent stands. Fall canker worm activity has increased because of reduced fire intervals causing top and branch mortality. However, recovery of oak communities is often rapid following disturbance. Decadent stands, when intermixed as they commonly are, with housing and other development, pose a risk to public safety from fire. Fire suppression in this type has resulted in a decrease in diversity of structure and pattern and increased fuels creating a much greater risk for more intense fires than occurred historically.

Bigtooth Maple: This cover type is found in the foothills where it is the ecological equivalent of Gambel oak and in some areas is capable of succeeding oak on more moist cooler sites. Maple often supports a sparse understory of grasses and forbs but has heavy leaf litter. It is capable of sprouting following fire. Fire suppression has resulted in longer than historical intervals with increasing age class, decreasing diversity in structure and pattern, and with maple replacing or co-dominant with oak in some areas.

Mountain Brush Complex: Chokecherry, serviceberry, gooseberries, mountain maple, mountain snowberry, and elderberry make up this cover type. These include species that resprout after fire and are intermingled with sagebrush at mid and conifer/aspen at higher elevations. Insect, disease, and fire intervals were historically in 20 to 40 year cycles. Suppression has allowed some pinyon-juniper and sagebrush to replace these communities and for encroachment of species such as Douglas–fir. Historic browsing primarily by wild ungulates has reduced the extent and crown cover of some mountain brush communities.

Tall Forb: This cover type is considered the "flower garden" of the mountains. Historically, tall forb communities were common throughout the mountains above 8,000 feet where precipitation exceeds 35 inches annually. More than half of these highly productive tall forb communities were lost years ago due to excessive livestock grazing with concurrent significant soil loss. Many sites are presently dominated by tarweed, knotweed, mulesear, and western coneflower. Site restoration is difficult or impossible because of soil losses. Except in the canyons of the Wasatch front, grazing continues to occur on many of the sites currently or historically supporting tall forb communities.

Sagebrush/Grasslands: These types are found throughout the Wasatch Mountains, covering more than 20 percent of the Wasatch-Cache National Forest portion of this area. While there are seven known species of sagebrush in the area, mountain big sagebrush makes up an estimated 60-70 percent and spiked big sagebrush makes up an estimated 20-30 percent across the landscape. **Mountain big sagebrush** occurs at elevations from 5,500 to 10,000 feet across a wide variety of landtypes. Fires historically occurred at about 20-40 year return cycles being lethal to individual sagebrush plants and favoring understory grasses and forbs. Fire in these landscapes typically burned in mosaic patterns leaving patches of several age and canopy classes. Currently many sagebrush communities are dominated by stands with greater than 15% sagebrush canopy cover due to a combination of fire suppression and livestock grazing. Forage utilization standards and monitoring are intended to increase grass and forb cover in these communities. At lower elevations, especially in foothills adjacent to urban areas, invasion of sagebrush by cheatgrass and various noxious weeds and annuals is common. **Spiked big sagebrush** generally occurs at elevations above 8,000 feet and is relatively productive having a greater diversity of wildflowers than mountain big sagebrush. Historical fire return intervals were 20-40 year cycles in mosaic patterns with spiked big sagebrush capable of sprouting after fire.

Riparian: These streamside communities occupy a relatively small proportion of the landscape, however, they are highly productive, and heavily used and valued by both people and animals. These communities are very diverse and range from tree-dominated (cottonwood, box elder, etc.) to shrub dominated (willow, dogwood, alder, birch, etc.) to herbaceous (wildflowers, grasses, sedges, rushes).

They are indicators of watershed conditions and play an important role in maintaining stream channels in a state of "dynamic equilibrium" where channel changes are at a rate consistent with sustaining hydrologic functions over time. Some riparian areas have disappeared because of overuse and changes caused by humans and domesticated livestock while others have been severely impacted. Water diversion, roads, timber harvest, grazing, and trampling including that

from recreation have been major causes of negative impacts such as lowering of water tables, erosion of stream channels, exotic plant encroachment, removal of beaver populations, increased water temperatures, concentrated runoff and increased sediment, and changes in vegetation density and composition, in riparian ecosystems. Also large areas of riparian and wetland ecosystems have been replaced by aquatic environments as a result of lakes and reservoirs behind human-built dams. Changes in historic flow regimes have reduced numbers and /or health of cottonwood trees in many areas. Changes in fire frequency have resulted in succession to conifers shading out deciduous species such as willow and aspen, which can cause reduced flows. Aquatic habitats are intertwined with riparian and upland vegetation conditions and can be negatively impacted as a result of increased erosion and sediment deposited in stream channels. This reduces exposed gravels for native fish spawning, broadens stream channels, creates shallow waters, reduces abundance and quality of pools, and increases water temperatures. Where streams have been down cut and water tables have dropped, riparian communities have been replaced by non-riparian species such as mountain big sagebrush, silver sagebrush, and Kentucky bluegrass. Streamside vegetation, food sources, and cover are also reduced as stream dynamics change and the effect is a net loss of aquatic and riparian species diversity.

Inventories were conducted on some high-priority stream channels on the Forest in 1992 and 1993. Approximately 29 percent of the nearly 119 inventoried miles were sampled in this ecological section. Of these inventoried miles of riparian area 42 percent were at PNC (potential natural communities), 47 percent were late seral, 4 percent were mid seral, 6 percent early seral and the remaining 1 percent in very early seral ecological condition. Because not attempt was made to inventory all miles of riparian these percentages do not necessarily represent the overall conditions in this ecological section.

Rare Communities: A few rare or unique plant communities occur in this portion of the forest. These include the single needle pinyon (*Pinus monophylla*) communities in Mollens Hollow RNA southeast of the Cache Valley, which are not globally rare, but are very rare in this ecological section. Also near Right Hand Fork, Logan River, on the Bear River Range, are references to disjunct occurrences of Gambel oak and white fir. These species, while abundant elsewhere in the Wasatch Mountains, are not known from this portion. East of Salt Lake Valley, there are unique side-slope thinleaf alder (*Alnus incana*) communities in Little Cottonwood Canyon. While thinleaf alder is not uncommon on the forest, it typically occurs along streams and rivers and does not occur elsewhere on the forest as these large, sideslope seep communities. In Big Cottonwood Canyon are some ponderosa pine (*Pinus ponderosa*) communities that are likely related to plantations in the early 20th century, but that are reproducing and maintaining themselves. These occur in and west of Mill D North Canyon.

Vegetation Patterns

The Wasatch Mountains occur within the Overthrust Mountains Section (Figure VEG-1), which is a part of the Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest – Alpine Meadow Province (McNab and Avers 1994). These mountains extend from just east of Nephi on the south to southern Idaho where the Bear River turns the bend south toward the Great Salt Lake (Cronquist and others 1972). In the Wasatch-Cache National Forest, the Wasatch

Mountains includes the Bear River Range and Wellsville Mountains on the northern portion (separated by the Cache Valley) and the Wasatch Range in the south-central portion of the Forest. These ranges represent a transition from the Great Basin to the Rocky Mountains.

On the west-facing slopes, juniper occurs from the Bear River Range west to the Wellsville Mountains and scattered along rocky ridges in the Wasatch Range. Juniper is also becoming more and more a part of the bigtooth maple communities between Wellsville and Brigham City.

Sagebrush (primarily with mature and old overstories) occurs from the lowest to subalpine elevations all along the Wasatch Mountains. Subalpine big sagebrush, mountain big sagebrush, and low sagebrush are non-sprouting species following fire. Spiked big sagebrush and silver sagebrush both sprout following fire. Mountain big sagebrush is probably the most common variety on the Forest, occurring from 4,500 ft. to over 9,000 ft. elevation on deep, well-drained soil. Spiked big sagebrush is also very common in the Wasatch Mountains occurring above 6,800 ft. in elevation and on deep, productive soils. Subalpine big sagebrush occurs in the Bear River Range near Franklin Basin and generally occurs on shallower, more rocky and less productive soils than spiked big sagebrush. Low sagebrush occurs on rockier, well-drained sites that typically have very low forage production. Silver sagebrush occurs in the North Sinks region of the Bear River Range and is not known to occur in large stands anywhere in the Wasatch Mountains. It typically occupies very moist, almost riparian sites. Sagebrush communities form relatively large stands, often included in aspen, conifer, and mountain brush mosaics on the landscapes.

Tall Forbs historically occurred in the Bear River Range as well as the Wasatch Range, but have experienced perhaps the greatest impacts of any vegetation community from historic livestock grazing. Few, if any of these communities in the Bear River Range occur with the diversity of species that they once had. Willard Basin and Ben Lomond Peak between North Ogden and Brigham City, and Albion Basin in Little Cottonwood Canyon still have relatively large expanses of this type in more-or-less natural condition. In parts of the Bear River Range, this type has been converted to a tarweed-dominated type or has significantly fewer desirable species.

Bigtooth maple forms a rim along the relatively low-elevation, eastern slopes of the Wellsville Mountains in Cache Valley. Maple communities also occur in the draws, often succeeding the Gambel oak communities described below. In the Cache Valley, these maple communities are similar in habitat to Gambel oak communities that do not occur on this portion of the forest, and that may be absent here because of colder temperatures held in the valley because of winter inversions. Rocky Mountain juniper is slowly increasing it occurrence in the male cover type in some areas, but not expected to replace maple in most areas.

Mature to old communities of Gambel oak are abundant on the west and south-facing foothills of the Wasatch Mountains from Brigham City south to the Uinta National Forest, but only occur as a dominant overstory species as far north as Brigham City (south and east of Hwy 89). Maple communities tend to replace the oak, primarily in moister draws. The northern-most known occurrence of Gambel oak on the Forest is in Right Hand Fork Canyon south of Logan Canyon.

Douglas-fir usually occurs in mature to old forms at lower forested elevations from the northern to southern borders of the Wasatch-Cache National Forest. They occur primarily on the western portions of the Wasatch Mountains. Douglas-fir may be succeeded by white fir in the southern portion of the Wasatch Range north to, but not including, the Cache Valley. Very little White fir occurs north of this area, although a few individuals have been reported in Right Hand Fork Canyon south of Logan Canyon. White fir has increased its distribution in some areas because it has succeeded Douglas-fir. Several stands along the Wasatch front have, however, been killed by western spruce budworm, Douglas-fir tussock moth, and the fir engraver beetle, which as noted above is at epidemic levels throughout the Wasatch Mountains from Ogden south.

Lodgepole pine occurs as narrow bands on north-facing slopes on the east side of the Bear River Range. Timber harvest has occurred in some of these stands, which adds some diversity to the age classes within these stands. In some portions of these communities aspen is a co-dominant and the same age as the lodgepole. Both species quickly reestablish themselves following disturbances such as timber harvest and fire. A few populations occur in Big Cottonwood Canyon and may have been planted here in the early 20th Century.

Aspen occurs in conjunction with the lodgepole pine, mixed conifer, and occasionally Douglas-fir and spruce-fir communities. In these areas aspen is an early seral component that has been largely replaced by the later-seral conifers. Climax aspen occurs in the Monte Cristo portion of the Forest east of Ogden Valley and in Big and Little Cottonwood Canyons east of Salt Lake City. It is considered to be climax in these areas because a conifer component is largely missing, which may be the result of either different site conditions or more likely because of the lack of a conifer seed source.

Spruce-fir occurs at highest portions of the Wellsville Mountains, Bear River Range and in the Wasatch Range east of Salt Lake City. This cover type also occurs as scattered communities in the areas in-between. This type is generally dominated by Engelmann spruce with subalpine fir a minor to dominant component and some scattered Douglas-fir at the lower range of this type.

Limber pine occurs at high elevations in the Wasatch Mountains on sites that are typically well drained and unable to support Engelmann spruce or subalpine fir. Understories are usually sparse, often with Oregon grape and kings fescue common components of the herbaceous layer.

Noxious Weeds

Appendix H1 lists the Utah and Wyoming Noxious Weeds and describes in more detail the occurrence of these species on the forest. This ecological section has a great variety and concentration of noxious weeds. The most common noxious weed in this area is dyers woad (*Isatis tinctora*). While most abundant along roadsides and travel ways, it extends away from these areas onto adjacent foothills and slopes. It occurs at nearly all elevations in the Bear River and Wasatch Ranges. Estimated population sizes range from less than 0.1 acre to over 650 acres. Leafy spurge has been found in both the Bear River and Wellsville Mountains and has been noted elsewhere on the forest as well. It occurs in the Mount Naomi and Wellsville Wilderness Areas. Musk thistle (*Carduus nutans*) has been found in the Bear River Range. Canada thistle (*Cirsium arvense*) occurs primarily along streams throughout the area, while hemlock has been

noted in only a few locations in this portion of the forest. Dalmatian toadflax (*Linaria dalmatica*) has been noted in the Bear River Range and is abundant along the foothills of the Wasatch Range. Russian knapweed and spotted knapweed (*Centaurea repens* and *C. maculosa*) are located in only a few areas in the Bear River Range and the Wasatch Range, but are considered to be the highest priority for treatment because of their expansive nature in other places they occur. Medusahead (*Taeniatherum caput-medusae*) and whitetop (*Cardaria draba*) have been found in the Bear River Range and whitetop has also been noted in the Wasatch Range as well. In addition to these noxious weeds, other undesirable plants, such as houndstongue (*Cynoglossum offionale*) and black henbane (*Hyoscyamus niger*), are also present in the Bear River Range. Other noxious weeds, such as field bindweed (*Convolvulus arvensis*), perennial pepperweed (*Lepidium latifolium*), purple loosestrife (*Lythrum salicaria*), diffuse and squarrose knapweeds (*Centaurea diffusa* and *C. virgata*), yellow starthistle (*Centaurea solstitialis*) and quackgrass (*Elymus repens*) may also be present throughout this portion of the Forest, but have not been noted by personnel on the Forest.

Bonneville Basin (Stansbury Mountains)

Vegetation Cover Types and Disturbance Regimes

Alpine: Vegetation here at elevations above tree line (greater than 9,000 feet) is patchy with thin soils. Even slight disturbance is significant because of slow recovery in this harsh environment. Past human recreation traffic and some grazing are the only disturbance to vegetation in the alpine area and the effects have been negligible based on limited historic information.

Limber Pine and Bristlecone Pine: These cover very small acreage in this mountain range. It is primarily composed of limber pine but with some bristlecone present on limestone substrates. Given the location in steep high elevation inaccessible areas, this type appears to be protected from any human caused impacts. The area gets frequent lightening strikes but fuel loading is sparse and fires usually do not carry.

Aspen: These communities occupy mid-elevations in canyon bottoms, near springs, and on moist cool side slopes. It is interspersed with Douglas-fir at higher elevations and tree ages vary from 60 to 150 years. Patchy, low-intensity fires at higher elevations and more extensive fires at low elevations historically regenerated aspen and kept age classes in balance. Fire suppression has resulted in some of this type being replaced by coniferous forest and cattle grazing and recreation can impact stands especially where cattle or people congregate.

White fir: This cover type occupies relatively minor acreage in drainages at low to mid elevations. It regenerates in shade of cottonwoods and aspen and is very sensitive to frequent low intensity fires. In the absence of fire, white fir has increased in numbers and density.

Douglas-fir: This cover type occupies a moderate amount of acreage in pockets on north-facing slopes. Historical stand structures were primarily even-aged, single-canopy stands. A variety of insects and diseases are associated including Douglas-fir beetle, Douglas-fir tussock moth, and dwarf mistletoe. Fire regimes were usually non-lethal at frequencies of 10 to 30 years on dry

sites, and 30 to 50 years on cooler/wetter sites with lethal fires very rare. Most stands have not burned in the past 100 years, have few seedling or sapling stands and are not actively regenerating. Fires suppression appears to have allowed Douglas-fir to overtake some aspen. Fuels have continued to build and potential for large lethal fires has increased. Older dense stands of Douglas-fir are also susceptible to Douglas-fir beetle.

Juniper (Pinyon-Juniper): This cover type is the most common vegetation type in the Wasatch-Cache National Forest portion of the Bonneville Basin. Juniper dominate most sites, while pinyon pine are scattered within some communities. Both Utah and Rocky Mountain juniper occur with Utah juniper on relatively drier sites increasing in density due to grazing and fire suppression and replacing sagebrush and in some instances mountain brush. Rocky Mountain juniper, on more moist sties, has not expanded as much as Utah juniper. Pinyon-juniper currently exceeds its historical distribution and density by as much as 60 percent. These pinyon-juniper communities occur on sites that were historically maintained in a sagebrush state through natural fires that occurred every 20-40 years. Currently, wind-driven crown fires can burn thousands of acres at a time, which is a radical change from the low-intensity surface fires every 10 to 30 years that were part of the historical fire regime. Historic grazing significantly reduced fine fuels and also accelerated loss of topsoils with resulting decrease in production of herbaceous vegetation in the undergrowth. Some stands have been chained and seeded to crested wheatgrass. An increase in pinyon-juniper is thought to have had a dramatic impact on local aquifers because of the transpiration use year-round.

Mountain Mahogany: This cover type is not common to this mountain range. Most is curlleaf mountain mahogany with birchleaf as a very limited component of the mountain brush type. Curlleaf mountain mahogany is evergreen, has a tree-like form, and has a number of disease pathogens. It is a weak resprouter following fire and reproduces mostly from seed. This type has been heavily browsed and is primarily in an old structural condition. It is being lost on dry southerly slopes where livestock and large ungulates overgraze reducing groundcover and degrading watershed conditions.

Mountain Brush Complex: This complex of species is relatively common and includes chokecherry, serviceberry, gooseberries, birchleaf mountain mahogany, mountain snowberry, and elderberry some of which sprout after fire. This complex occurs on slightly moister areas than sagebrush with annual precipitation of 15 to 25 inches. It occurs in mosaics with sagebrush and conifer/aspen or aspen providing a highly diverse landscape cover. Fires suppression has resulted in mature to old age classes of dominant shrubs, which is uncharacteristic of a type that historically burned every 20-40 years.

Tall Forb: While the tall forb vegetation cover type has not been mapped in the Stansbury Mountains, forb-dominated plant communities occur here. They are similar to forb communities that occupy drier, often rocky sites in the Wasatch Mountains with species such as bee balm (*Mondardella odorotissima*), spike fescue (*Leucopoa kingii*), scarlet gilia (*Gilia aggregata*), rock goldenrod (*Petradoria pumila*), and various species of beardtongue (*Penstemon* spp.) present. As vegetation mapping procedures improve, this type will possibly make up about 1 percent or more of the Wasatch-Cache National Forest portion of this mountain range.

Sagebrush/Grasslands: Sagebrush and grasslands are common at elevations of 5,500 to 10,000 feet, with mountain big sagebrush composing an estimated 80-90 percent of the landscape and other sagebrush species being minor. Fire regime historically had a return interval of 20-40 years with fires lethal to individual sagebrush plants and favoring understory grasses and forbs. Historic fire patterns created a mosaic of several age and canopy classes within any given landscape. Many acres of mountain big sagebrush have been treated and replanted to crested wheatgrass on the lower eastern portion of the Stansbury Mountains and it continues to be a major component among a few native species. Where treatments have not occurred, sagebrush stands are dominated by mature shrubs with greater than 15 percent canopy cover and ground cover less than 85 percent of potential (which does not provide adequate soil protection). Many acres of mountain big sagebrush have been replaced by pinyon-juniper because of removal of fire and reduction of fine fuels in the understory. Soil stability and productivity may be seriously affected from a loss in understory vegetation and surface erosion may increase. Fires that have occurred recently on the Stansbury Mountains have resulted in a decrease in juniper and an associated increase in early seral Sagebrush/Grassland communities. Without aggressive reseeding of perennial grasses and forbs following fire, cheatgrass has and will continue to dominate many drier landscapes.

Riparian: These communities are a small amount of the land base, but are highly productive and heavily used by people and animals. A Few live water streams and many seeps characterize the area and springs scattered over the landscape. Many water sources become subterranean with most of the larger stream systems becoming dry near the Forest boundary because of water diversions for downstream users. Recreation use is often very high wherever there is live water adjacent to accessible roads with consequent soil compaction and loss of streamside vegetation. Some aquatic habitat improvements (gabions, log structures) have been installed to improve habitat for species including Bonneville and Colorado River cutthroat, rainbow and brown trout. Significant negative effects from a variety of uses include lowering of water tables, erosion of stream channels, exotic plant encroachment, removal of beaver populations, increased water temperatures, concentrated runoff and increased sediment from road construction, and changes in vegetation density and composition. White fir has replaced some of the cottonwood stands shading out deciduous willows. *Cytospora* and scale insects have adversely affected viability of cottonwood and willow in some areas. Interruption of historic disturbance patterns and several decades of reduced flows have led to a decrease in numbers of cottonwood trees. Other changes resulting from fire suppression include white fir, Douglas-fir, pinyon-juniper and sagebrush increases with water use year round reducing the amount of water available for stream flows. Aquatic habitats are intertwined with riparian and upland vegetation conditions and can be negatively impacted as a result of increased erosion and sediment deposited in stream channels. This reduces exposed gravels for native fish spawning, broadens stream channels, creates shallow waters, reduces abundance and quality of pools, and increases water temperatures. Streamside vegetation, food sources, and cover are also reduced as stream dynamics change and the effect is a net loss of aquatic and riparian species diversity.

Inventories were conducted on some high-priority stream channels on the Forest in 1992 and 1993. Approximately 3 percent of the nearly 119 inventoried miles were sampled in this ecological section (the Stansbury Mountains have a relatively low percent of the forest's total riparian areas). Of these inventoried miles of riparian area 15 percent were at PNC (potential

natural communities), 58 percent were late seral, 14 percent were mid seral, 10 percent early seral and the remaining 3 percent in very early seral ecological condition. As previously noted, because not attempt was made to inventory all miles of riparian these percentages do not necessarily represent the overall conditions in this ecological section.

Rare Communities: As noted above, there are some bristlecone pine (*Pinus longaeva*) communities in the Stansbury Mountains that do not occur elsewhere on the forest and that are generally uncommon throughout their range. These bristlecone have been described as infrequent, but "locally dominant on limestone slopes at moderately high elevations" (Taye 1983).

Vegetation Patterns

The Stansbury Mountains are part of the Bonneville Basin Section, which occurs within the Basin, and Range physiographic province as described by McNab and Avers (1994). The relatively low precipitation in this Section (up to 18 inches on the mountains) affects the plant communities that occur. Salt desert communities, while generally not present in the Wasatch-Cache are common at elevations below the forest boundary on the west side of this mountain range. The lower foothills on the western portion of the Stansbury Mountains are dominated by juniper, which has invaded many sagebrush communities that once dominated these sites prior to fire suppression. Fire historically played a large role in controlling the expanse of juniper on these lower sites. Juniper is a more natural component on rockier sites above and within these foothills, because fire had a more difficult time burning with the naturally lower fuels.

Sagebrush communities, while not as expansive as they were historically, generally occur from low to upper elevations. On the east side of the Stansbury Mountains, crested wheatgrass was seeded on many acres during the 1960's. Because of the long-lived and competitive nature of crested wheatgrass, this species is still the dominant species on many of these areas although some natives, such as bluebunch wheatgrass, are beginning to reestablish.

While aspen communities are not as big a component as is found elsewhere on the Forest, they are still an important part of mid-elevations in the Stansbury Mountains. In many areas aspen is being replaced by Douglas-fir and occasionally by some white fir in riparian areas.

Douglas-fir communities are common mid-elevation communities within the conifer belt of the Stansbury Mountains. At the upper reaches of Douglas-fir dominance there is a transition into spruce-fir communities. White fir is invading riparian communities along South Willow and North Willow channels and is becoming a minor component in Douglas-fir stands.

The Engelmann spruce and subalpine fir (Spruce-fir) communities, while not covering large acres within the Stansbury Mountains, are present at elevations above the Douglas-fir as well as on cooler, moister sites within the Douglas-fir belt. At the highest elevations below timberline in the range, these communities often form a mosaic with the limber pine-bristlecone pine communities.

Both limber and bristlecone pines occur at the upper forest zone, just below timberline in the Stansbury Mountains.

Alpine and subalpine forbs occur at higher elevations in the Stansbury Mountains. Deseret Peak, at just over 11,000 feet elevation, offers what little alpine habitat there is in the Stansbury Mountains. These sites are generally rocky rather than sod forming with scattered vegetation.

Noxious Weeds

Appendix H1 lists the Utah and Wyoming Noxious Weeds and describes in more detail the occurrence of these species on the forest. Whitetop has been noted along many drainages in the Stansbury Mountains including, but not limited to North Willow, South Willow, Big Hollow, Barlow, Spring Creek, Round, Big Granite, Monument, and Chokecherry Canyons. Other species are likely to occur, but have not been inventoried.

Uinta Mountains

Vegetation Cover Types and Disturbance Regimes

Alpine*:* Distribution of alpine plant communities is tied to rock type, landform, and depth and duration of snow cover. Lewis (1970) described the Curly Sedge/Cushion Plan, Alpine Avens-Sedge and Sedge-Alpine Avens, Sedge-Grass, Wet Meadow and Bog, Dry Meadow, and Alpine Shrub communities. We have not mapped the alpine communities to this level of accuracy. Areas of semi-barrens vary from year to year depending on the persistence of snow cover and in "good" years are covered with sparse vegetation. Talus creep and cliff faces support other plant communities and the Red Pine Shale formation supports the sensitive plant species, alpine poppy. Limestone substrates support different plant composition than the common quartzite. Except for the sheep driveway, at localized salting and bedding grounds, and where high recreation use is concentrated (Naturalist Basin), alpine plant communities appear to be much as they might have been prior to European settlement. However in these use areas, ground cover is significantly lower than potential, and erosion has occurred resulting in watershed concerns.

High Elevation Engelmann Spruce: These communities occur from above 10,400 feet elevation and extend down to about 10,000 feet. Spruce trees are 300-400 years and older with little or no replacement by subalpine fir. Typical fire regime is small infrequent fires with long intervals (300 years or more) between disturbance and maturation of forests. Uneven age and old stands dominate. Very little of these forests have been harvested and they show comparatively little mortality from insects with frequency of insect epidemics much lower than for lower elevations. At the highest elevation, these communities are represented by stunted krummholz conditions because of the severe environmental conditions that occur.

Spruce-Fir: As noted in Table VEG-1, this type covers over 20 percent of the Wasatch-Cache National Forest portion of the Uinta Mountains. Spruce-fir occurs in the western portions of the Uintas between elevations of 8,000 and 10,000 feet. These communities often occur as relatively small group stands rather than the large continuous forest more typical of mixed conifer. Engelmann spruce is long-lived (250 to >300 years), on cool moist sites and has shallow roots

(susceptible to windthrow); and most stands are in multi-canopy structural condition. Subalpine fir is similar in ecology but shorter-lived (100-150 years). Blue spruce is a very minor component with aspen, lodgepole pine, and a few Douglas-fir associated in mixed or seral stands. Harvest of spruce-fir stands was common both prior to and after World War II. The majority of the type is mid-aged and mature to old with many stands uneven-aged and/or multi-storied. Areas harvested are covered with sapling and seedlings with composition weighted toward subalpine fir. There is a dynamic cycle between spruce and subalpine fir dominance depending on stand conditions and insect activities with subalpine fir co-dominating during the first century and then declining while the stand becomes dominated by Engelmann n spruce. Historic fire regimes were mixed with small fires burning individual trees to a few acres on a relatively frequent basis within most stands. These lethal small fires served to create uneven-aged stands. Less frequent stand-replacing fires occurred on a 200 to 400 year cycle creating an earlier seral stage with more even-aged stands. There is increasing risk from fire and insects because of the increasingly mature component of stands as a result of fire suppression.

Mixed Conifer-Uinta Mountains: This type occurs between 9,000 and 10,500 ft. elevation. A conspicuous difference between this type in the Uinta Mountains and many other areas is the strong presence of mature and old lodgepole pine intermixed with Engelmann spruce with rather low presence of subalpine fir. Lodgepole pine often clearly dominates stands, reflecting its more-rapid establishment following disturbance. In places subalpine fir shows a strong presence in shrubby form by layering, however it appears that the vast area of quartzite materials of the Uinta Mountain Group present substrates on which subalpine fir fails to express dominance. As noted in Table VEG-1, this type covers nearly 25 percent of the Wasatch-Cache National Forest portion of the Uinta Mountains. Areas of this type outside Wilderness have been harvested and a mountain pine beetle epidemic swept the eastern but not western Uinta Mountains. Historic fire regimes were lethal fires on a 100-300 year cycle. Following fire, lodgepole pine tends to dominate stands for a period while spruce a shade-tolerant species, eventually again becomes a significant component. Without fire or other disturbance, the lodgepole pine component will be greatly reduced.

Lodgepole Pine: In the Uinta Mountains lodgepole pine occupies large areas in unbroken stands. Historical fire regimes included large stand replacing fires at intervals of 100-200 years followed by rapid regeneration of trees with a resulting relatively few age classes across the landscape. Mountain pine beetle is also a contributor to regeneration creating conditions suitable for large fires. Dwarf mistletoe is an active agent throughout theses ecosystems with highly variable levels of infestation. Clear cutting has been widespread as well as tie-hacking in the Blacks Fork and Bear River drainages. Tie hacking was a process of tree harvest and placement of trees in waterways where streams backed up large amounts of water, then blasted to allow the trees to flow downstream off the forest for cutting into railroad ties. This practice affected both thousands of acres of upland (clear-cut) and riparian ecosystems with effects evident even today. Early harvests was done in blocks of 300-500 acres or more with later harvest limited to 40 acre blocks considering elk hiding cover. Gently sloping areas have mostly been harvested with long persistent lodgepole remaining on steeper or rockier areas. Mountain pine beetle heavily impacted lodgepole pine in the Uinta Mountains in the early 1980's. For several years, many thousands of acres of lodgepole were treated to minimize impacts from the beetle, but these treatments were, for the most part, unsuccessful in the long term. The largest number of acres

affected by the beetle occurred on the Ashley National Forest in the eastern portion of the Uinta Mountains.

Aspen: Three distinct categories of this type have been identified. **Conifers** eventually replace **Seral Aspen** in the absence of disturbance. **Seral Aspen-Lodgepole** is composed of co-dominate aspen and lodgepole with both regenerating after fire. **Climax Aspen** is usually at lower elevations and/or drier sites where conifer encroachment remains low with or without fire or other disturbance. On the north slope of the Uinta Mountains there has been a large loss of **Seral Aspen** to mixed conifer and spruce-fir as a result of fire suppression. Conifers make up more than 35% in most existing aspen stands except in the eastern Uintas where mountain pine beetle in the 1980s and harvest in the past 50 years has regenerated seral aspen. 70-80% of aspen stands are mature or old age classes with a resulting loss of structural diversity. Expanding elk herds also pose a risk to regenerating seral aspen. The historical fire regime was for lethal fires at intervals needed to keep aspen abundant and vigorous. **Seral Aspen-Lodgepole** is the largest aspen cover type with most stands in the mature to old age classes as a result of successful fire suppression. Stands are becoming dominated by lodgepole pine without lethal fire return intervals within the historic range but where pine bark beetle has killed lodgepole stands have been rejuvenated. **Climax Aspen is** typically adjacent to sagebrush/grasslands on lower elevation sites that cannot support conifers. Some clones have great ability to regenerate under mature stems while others do not. Most of these stands are in the mature and old age classes affecting structural diversity but clone-by-clone evaluation is necessary to determine proper functioning condition. Expanding elk herds pose a risk, which has become significant in some areas.

Interior Douglas-fir: This community is confined to a limestone belt with much in the eastern Uinta Mountains in mid to old age classes. Historic fire regimes were non-lethal and mixed severity on a 10-25 year cycle on drier sites and 30-50 years on wetter sites. Lack of non-lethal ground fires has allowed for an increase in the shade tolerant true firs and a build up of dead and down ladder fuels. In some areas this type is being replaced by White fir. Insect activities do not currently exceed endemic levels but conditions are such that most stands rate out at “high” risk because of stand densities and age. Clear cutting in this type has resulted in slow tree regeneration and created grass/forb openings. Douglas-fir is moving into sagebrush, mahogany, and mountain brush communities in the absence of fire. The lack of fires during the last century increases the likelihood that fires will be stand replacing and may result in greater watershed damage than historic fires.

Juniper (Pinyon-Juniper): This is a minor cover type occupying less than 1000 acres in the western portion of this area. No pinyons are known to occur in this portion of the Uinta Mountains Ecological Section. Historical fire return intervals were 50-200 years. Without fire, juniper crown closure results in a significantly reduced understory exposing soils to erosion because of lack of ground cover. Old stands with risk to watershed conditions are within the historic range of variability. Risk of cheatgrass invasion exists especially where fires are not followed with the seeding of vigorous perennial species that have high ability to compete with it.

Mountain Mahogany: Both Birchleaf Mahogany and Curlleaf Mahogany occur in the Uinta Mountains. **Curl-leaf Mountain Mahogany** is a poor sprouter, readily killed by fire. It has winter persistent leaves and is highly hedged by wildlife, including mule deer, elk, and moose.

Stands in this area are relatively small (100 to 200 acres) and show that concentrated elk and moose utilization are resulting in declining conditions (vigor, density, and reproduction). Fire regimes were historically mixed severity/lethal on a 50 to 70 year cycle. **Birchleaf Mountain Mahogany** sprouts after fire and is found from about 6,000 to 9,000 feet elevation with lower areas seral to pinyon-juniper and higher areas seral to Douglas-Fir. Curl-leaf mahogany stands in the Kamas Ranger District are not regenerating, possibly because of lack of seed set and/or germination. Stands are old with tall, highlined structure and cheatgrass has invaded.

Gambel Oak: This community is present along the western end of the Uinta Mountains. Gambel oak is a prolific sprouter with Bigtooth maple a common component on more moist sites. Oak expanded somewhat into areas of sagebrush/grass. Historic fire regimes were mixed severity with crown fires every 20 to 50 years. Fire suppression has resulted in reduced understory species and cheatgrass is common in lower elevation stands adjacent to agricultural lands. A variety of insects are common to the oak type; however, none of the native insect species has posed a serious threat to the oak to date. Residential encroachment is occurring in this type in many foothill areas and there is increased potential fire intensities because of fuel build up.

Tall Forb: Tall forb communities occur only on the western portion of the Uinta Mountains on limestone-derived soils. It is estimated that about 50 percent of the sites once occupied by tall forbs are no longer present because of loss of productive topsoil resulting from historic impacts of heavy livestock grazing. On sites where potential remains, plant composition has changed significantly and currently many of these sites have high gopher populations, which prevents development of perennial forb cover. Invasion of tarweed, mulesear, and other weedy species are common. Risks to the type include uncontrolled livestock grazing, continued loss of topsoil, and invasion of annual weedy species (tarweed and knotweeds) and noxious weeds.

Sagebrush/Grasslands: Of eight known taxa of sagebrush in the area, mountain big sagebrush is the most common. The fire regime historically was on about a 20-40 year return interval, with sagebrush having the ability to return to pre-fire cover within 20 years. The majority of sagebrush is currently in older age-classes with higher canopy cover and reduced grass-forb cover. Spiked sagebrush, while less common, occurs on more moist sites. Silver sagebrush occurs adjacent to many streams on the north slope, but is not common on the western portion of the Uinta Mountains. Silver sagebrush and spiked sagebrush both have the ability to sprout following fire and, therefore, these communities return to pre-burn canopy cover more quickly.

Riparian: Inventories were conducted on some high-priority stream channels on the Forest in 1992 and 1993. Approximately 68 percent of the nearly 119 inventoried miles were sampled in this ecological section. Of these inventoried miles of riparian area 42 percent were at potential natural community status (PNC), 47 percent were late seral, 4 percent were mid seral, 6 percent early seral and the remaining 1 percent in very early seral ecological condition. As previously noted, because no attempt was made to inventory all miles of riparian these percentages do not necessarily represent the overall conditions in this ecological section. In the Uinta Mountain Section, the PFC assessment (USDA Forest Service 1998c) divided these areas into **Stream Canyon Riparian Complexes** and **Subalpine Meadow Complexes, which** are described in more detail below.

Stream Canyon Riparian Complexes: These complexes occur at all elevations with a great diversity of communities associated and structural diversity that exceeds all other cover types. Both deciduous and evergreen trees (aspen, narrowleaf cottonwood, box elder, and rarely bigtooth maple; limber pine, lodgepole pine, Douglas-fir, blue spruce, Engelmann spruce, and subalpine fir) occur along with tall shrubs and low trees (thinleaf alder, western birch, Bebbs willow, Scouler willow, caudate willow) and shorter shrubs (Booths willow, Drummonds willow, Geyers willow, red-osier dogwood, and woods rose) in addition to an herbaceous layer of grasses, sedges, and forbs. Because these generally narrow communities are often adjacent to moderate to steep gradient streams well armored by rock and adjacent to conifer communities, they are typically protected from large amounts of domestic or wild grazers. Timber harvest has been minor and structural diversity is high. Fuel loading is extreme in some places but in general these communities can be expected to recover rapidly from fire, which historically was on a 100-200 year cycle.

Subalpine Meadow Complexes: These plant communities vary with geomorphology and both wet and dry conditions. Wet meadow complexes are dominated by plainleaf willow, water sedge, mud sedge, few-flowered spikerush, deerhair bullrush, marsh marigold, elephants head, and other wetland species intergrading into tufted hairgrass communities transitioning into dry meadow complexes dominated by timber oatgrass or sheep fescue. Wolfs willow is common where the water table is at or near the surface for much of the growing season. Red Pine Shale occurrence is accompanied by barrens and semi barrens with inherent infertility and varying degrees of resistance to erosion. Cattle allotments are common at lower elevations and some of these meadow complexes have been without livestock grazing for many years. Impacts from years of livestock grazing to some of these broad meadow complexes are apparent with ecological status ranging from very early seral to potential natural. Recreation stock use is common in these areas while hiking and camping are largely confined to trails running through meadows and in the vicinity of lakes. Beaver are common where willows and aspen are available for dam construction. Their activities store water and raise the water table expanding riparian areas and trapping stream sediments. Ponds provide habitat for fish, birds, and aquatic furbearers. Dry meadow complexes are more sensitive than wet to sheep grazing because they receive more use. Where livestock have been removed or numbers reduced from those of the early part of the century, composition and ground cover can return to proper functioning.

Rare Communities: Ponderosa Pine communities are present and only in a small amount (about 500 acres) on the Kamas Ranger District. This is the westernmost extent of ponderosa pine in northern Utah, with the exception of a few scattered individuals and small groups in the Wasatch Mountains. Historic non-lethal ground fires with a return interval of 5 to 25 years would have cleared the ground of some of the duff layer and provided favorable seedbeds for ponderosa pine regeneration. Successive fires would have favored continued growth of established ponderosa pine saplings. Planting of ponderosa pine as well as clearing of invading juniper aimed at perpetuating the Ponderosa pine has been completed. In addition, there are some unique spruce communities with water birch as a component on the lower meadows typically north of the forest, but also occurring in a few locations on the eastern portion of Evanston Ranger District/western portion of the Mountain View Ranger District. Some white fir, which is

identified as a Wyoming State rare species (S1), has been noted on the northern portions of the Uinta Mountains. Its presence on the Forest has not been identified to date, but if present would be important to protect.

Vegetation Patterns

The Uinta Mountains are an ecological section, which, like the Overthrust Mountains Ecological Section, are within the Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest – Alpine Meadow Province (McNab and Avers 1994). The Uinta Mountains are primarily in northeastern Utah with a small portion occurring in southwestern Wyoming and western Colorado. The patterns of vegetation across the Uinta Mountains are fairly uniform from east to west, although landscape patterns west of Stillwater are more similar to the Wasatch Mountains. In addition, there are limestone uplifts within the northern portion of the Uinta Mountains that run east-west with north-facing slopes typically dominated by Douglas-fir and south-facing slopes often dominated by sagebrush.

In general, going from north to south (lower elevation to higher elevation) on the North Slope of the Uinta Mountains the plant communities include open sagebrush flats, aspen, lodgepole, Uinta Mountain mixed conifer (a mixture of lodgepole pine, Engelmann spruce and subalpine fir), spruce-fir forests, high elevation Engelmann spruce, including krummholz, semi-circular rocky cirque basins, and alpine tundra. Interspersed at higher elevations throughout this portion of the North Slope are a profusion of lakes, streams and wetlands.

While present throughout the Uinta Mountains, sagebrush communities are most evident in the western Uinta Mountains near Whitney Reservoir, on the western face of the range east of Kamas and Oakley, and on the far eastern portion of the Forest adjacent to birchleaf mountain mahogany, aspen and lodgepole communities. Nearly all sagebrush stands are mature with canopy cover over 15 percent. Some stands on the south faces of limestone ridges have been treated within the past 10-15 years and have a more open canopy. Silver sagebrush is a common component adjacent to riparian ecosystems and is sometimes a part of riparian ecosystems.

Tall Forb communities historically occurred in the western portion of the Uinta Mountains (Hoyts Peak and Whitney areas), but have experienced impacts from historic livestock grazing. In parts of the Hoyts Peak area, this type has been converted to a tarweed-dominated type and has experienced significant soil loss as well. This loss of topsoil has made the natural recovery of these sites very difficult.

Birchleaf mountain mahogany occurs in the vicinity of Widdop Mountain on the eastern portion of the forest on the North Slope. Birchleaf mountain mahogany communities are managed so that use of browse is at a level that not only provides for the continued maintenance of existing vegetation, but also provides for the continued reproduction and replacement of decadent and dead individuals within the stands.

Aspen stands on the northern most fringes of the Uinta Mountains are climax in nature, not being replaced over time by conifers in the overstory. These typically have common juniper (a shrub form of juniper) in the understory. They occur on the drier fringe of the forest ecosystems.

Somewhat higher in elevation pure lodgepole pine communities occur. In many cases aspen is a component and a seral co-dominant.

Lodgepole pine occurs on the lower portion of the conifer forest zone in the Uinta Mountains. At these lower elevations, lodgepole pine is generally not seral to spruce and fir. It may be associated with aspen, and where it is they often co-dominate before and after fire, but with continued fire suppression, these stands will eventually become dominated by lodgepole alone.

The role of fire in the lodgepole pine, mixed conifer and aspen ecosystems has been replaced to some extent by timber harvest over the last 100 years. Extensive tie hacking in the late 1800's/early 1900's produced uneven-age stands and affected watershed and wetland functions. Logs cut for railroad ties were placed in several streams on the north slope of the Uinta Mountains. Large dams were formed with these logs, and then blasted so the logs would flow northward off the forest. This practice affected the riparian areas to an extent that is still unknown.

Above the band of pure aspen, lodgepole pine and aspen regenerated concurrently following fires with mixed regimes (some stand replacing and some ground fires). Most of the pure lodgepole pine type appears to have regenerated following large, stand replacing fires. Some of the lodgepole pine stands on drier sites appear to have experienced cycles of surface or mixed severity fires that allowed them to develop an uneven-aged structure.

Douglas-fir communities are restricted to limestone outcrops at mid to upper elevations in a band across the north slope of the Uinta Mountains. Most of these stands are mature to old in age class.

A majority of the forested stands on the north slope of the Uinta Mountains are what have been described as the Uinta Mountain mixed conifer communities, dominated by a mixture of lodgepole pine, Engelmann spruce, and subalpine fir. There is no clear succession to spruce-fir dominance as is evidenced by the presence of mature trees (150 years or older) of each of these overstory dominants. Aspen, as previously noted, occurs from the northern fringes of the forested portion of the Uinta Mountains. In addition, it occurs up to the spruce-fir zone but is primarily a major component in the lodgepole and Uinta mixed conifer zones. These forests are dependent on disturbance to maintain a properly functioning condition.

At even higher elevations, spruce-fir communities occur. These differ from the mixed conifer communities at lower elevations in their lack of lodgepole pine. Disturbance regimes historically included smaller, more localized fires. Pure Engelmann spruce communities occur at the upper tree line and often grade into krummholz growth forms at the uppermost elevations, where it occurs.

Upper elevation forested stands (both spruce-fir and Engelmann spruce) appear to have a relatively infrequent fire history that is probably due in part to the wetter conditions during the fire season. These upper elevation stands are frequently in smaller patch sizes with changes in species composition dependent on how large and intense the fires were and how long succession from seral lodgepole pine to subalpine fir and Engelmann spruce has been progressing.

Rock talus (barren) sites are an important part of the upper landscape, but tend to form the cirque basin walls below the alpine communities, which are the uppermost vegetation zone in the Uinta Mountains. These differ from those on other ecological sections of the Forest because of the abundance of vegetation cover, which results from more soil and relatively fewer rocky outcrop sites.

Noxious Weeds

Appendix H1 lists the Utah and Wyoming Noxious Weeds and describes in more detail the occurrence of these species on the forest. Dyers woad is beginning to expand into this management area from adjacent Utah. While it has only been noted at one location along Beaver Creek east of Kamas, it is on several sites south of Evanston. White top has been noted in some of these areas as well. Canada and musk thistle are common throughout this area, spotted knapweed has been found near the forest boundary south of Mountain View.

General Effects

The ecosystem management principle of sustainability implies our ability to define and measure the status of ecosystems now, as compared to their historic range of variability. The concept of "historic range" recognizes that ecosystems are dynamic in nature and that disturbance and change is a common component. Areas that are within their historic range of variability are said to be in "properly functioning condition" (PFC).

Properly Functioning Conditions Assessment Summary

An assessment of PFC of vegetation cover types in National Forests in northern Utah (Ashley, Uinta and Wasatch-Cache National Forests) was completed in 1998 (USDA Forest Service 1998). Historic reference conditions for this area, including the Wasatch-Cache National Forest, were based on fire history studies, historical records, and documentation of historic uses of these lands both prior to and after the establishment of the National Forest System. Consistent with the ecosystem management principle of humans as ecosystem components, we include Native American actions (such as setting fires) prior to the settlement of Europeans, in the picture of historic reference conditions. These ecosystems did evolve in a sustainable manner with humans as integral parts. Table VEG-2 shows both the desired an existing age class diversity for vegetation cover types on the Wasatch-Cache National Forest portions of the Bonneville Basin, Overthrust Mountains, and Uinta Mountains Ecological Sections.

Ecological conditions were assessed by looking at four distinct aspects or ecosystem features: 1) Composition- the species list; 2) Structure- the layers and ages of species; 3) Patterns- the patchwork of species and ages across the landscape; and 4) Functions- processes and how they occur and interact on the land.

The PFC Assessment completed for the northern Utah national forests (Ashley, Uinta, and Wasatch-Cache National Forests) focused primarily on changes in patterns over the landscape (e.g. aspen cover types being replaced by various conifer cover types or sagebrush/grasslands being replaced by pinyon-juniper through the control of fires over the past 50 to 100 years) with

some focus on changes that have occurred in age class diversity (structure) and species composition primarily in forested ecosystems. From these changes we infer changes in the way these ecosystems function.

Table VEG-2. Existing and desired age class diversity for vegetation cover types occurring in the Wasatch-Cache National Forest portions of the Bonneville Basin (BB), Uinta Mountain (UM), and Overthrust Mountain (OM) Ecological Sections.

Cover Type	Desired Age Class Diversity	Existing Age Class Diversity
Limber Pine, Bristlecone Pine	Grass/Forb, seedlings - saplings = 10 - 20% Young, Mid Aged &Mature forests = 30 - 50% Old Forests = 20 - 40%	BB - Most stands are in the mature stages (>80 years old) with little young or very old stands. UM-Not Present OM - All Mature to Old
Engelmann Spruce – Subalpine Fir	Grass/Forb = 5-15% Seedling/Sapling = 5-15 % Young Forest about = 10-30% Mid Aged Forest about = 10-30% Mature Forest about = 10-30% Old Forest about = 10-30%	BB - Minor component OM - more than 40% of the type in mature or old age classes UM - Grass/Forb = 0 Seedling/Sapling = 0 Immature = 7% Mature =6% Old = 87% OM - Grass/Forb = 0% Seedling/Sapling = 0% Immature = 1% Mature = 2% Old = 97%
Aspen	Grass/Forb - Seedling/Sapling = 20 - 40 % Immature = 20 - 40% Mature = 20 - 40%	BB – Grass/Forb - Seedling/Sapling = <1% Immature = 10% Mature = 90% UM – Grass/Forb - Seedling/Sapling = 31% Immature = 2% Mature = 67% OM – Grass/Forb - Seedling/Sapling = <1% Immature = 1% Mature = 99%
Mixed Conifer – Lodgepole Pine	Grass/Forb = 5-15% Seedling/Sapling = 5-15 % Young Forest about = 10-30% Mid Aged Forest about = 10-30% Mature Forest about = 10-30% Old Forest about = 10-30%	BB – Not present UM – Grass/Forb = 1% Seedling/Sapling = 7% Immature = 10% Mature = 80% Old = 2%

Cover Type	Desired Age Class Diversity	Existing Age Class Diversity
		OM – Grass/Forb = 2% Seedling/Sapling = 1% Immature = 3% Mature = 94% Old = <1%
Interior Douglas-fir	Grass/Forb = 5-15% Seedling/Sapling = 5-15 % Young Forest about = 10-30% Mid Aged Forest about = 10-30% Mature Forest about = 10-30% Old Forest about = 10-30%	BB – Nearly all stands are in mature and old age classes. UM – Grass/Forb = 0% Seedling/Sapling = 0% Immature = 11% Mature = 89% Old = <1% OM – Grass/Forb = 0% Seedling/Sapling = 0% Immature = <1% Mature = 99% Old = <1%
Pinyon-Juniper	Grass/Forb = 5-15% Seedling/Sapling = 5-15 % Young Forest about = 10-30% Mid Aged Forest about = 10-30% Mature Forest about = 10-30% Old Forest about = 10-30%	BB - Most juniper stands are mature or old. UM - Currently more than 40% is mature and old (insignificant on the W-C portion of the Uinta Mountains) OM - More than 40% of the stands are in mature and old age classes.
Gambel Oak	Seedling/Sapling about 30-60% Immature 20-40% Mature 20-40%	BB – Not present UM – Component confined to a small portion of the Western Uinta Mountains Management Area. OM – Seedling/Sapling = 7% Immature = 18% Mature = 75%
Sagebrush (Big)/Grassland	<5% crown cover = 10-30% 5-15% crown cover = 30-50% >15% crown cover = 30-50%	BB - Many stands are skewed toward greater crown cover closure. UM - Overall a balanced range of structural stages. OM - Mountain big sagebrush skewed toward greater crown cover closure.

The primary impacts to ecosystems in northern Utah National Forests that have caused ecosystems to no longer be within their range of historic variation are the exclusion of fire through suppression, historically high livestock grazing levels, and the damming and diversion of water. In addition, impacts to riparian ecosystems have resulted from livestock grazing as well as from road construction and from heavy recreation use. Fire exclusion has resulted in a reduction in age class diversity of most shrub- and tree-dominated cover types. Probably most significant is the greater than 60 percent reduction in acres of aspen communities on the Wasatch-Cache National Forest. Heavy livestock grazing resulted in a loss of protective ground cover, which had severe impacts to watershed conditions through soil erosion and impacts to the riparian ecosystems. In addition, livestock grazing resulted in a large change in plant composition allowing for the invasion of non-native species and/or an increase in less palatable native species. The damming and diversion of streams has had a large impact on the stream environment. Dams have created barriers to the movement of fish while diversions have resulted in the complete loss of water from some streams and abnormally high, sustained flows in others.

A summary of the PFC assessment for the National Forest of northern Utah (Table VEG-3) shows some obvious areas where conditions across landscapes are no longer properly functioning based on current vegetation conditions. Those areas with a high deviation from historic range of variability are considered to be non-functioning or poorly functioning while those with a moderate deviation from their historic variability may still be functioning, but at risk. Some of the most notable communities at risk are the seral aspen (over 65 percent of the seral aspen communities on the Wasatch-Cache National Forest have been, or are rapidly being, replaced by conifer tree-dominated communities), seral aspen-lodgepole, Engelmann spruce, interior Douglas-fir, tall forb, riparian, and aquatic ecosystems. The oakbrush communities, while noted as having a low to moderate deviation from historic conditions, have been protected, to the degree possible, from fire. Because this has resulted in a build up of fine fuels, and because more and more homes are being built up to the edge of the oakbrush communities (comprising many of the acres now referred to as Wildland Urban Interface or WUI), there is an ever-increasing threat to property and safety from even larger wildfires in the future. In addition, sagebrush communities were noted as having moderate to high variation from historic conditions (Table VEG-3). These are different that those identified in PFC evaluation for National Forests in northern Utah (USDA Forest Service 1998c). In that document evaluations did not account for the predominantly old age classes of spiked and mountain big sagebrush stands with typically dense (>15 percent) sagebrush canopies. The moderate to high ranking in the Bonneville Basin Section in Table VEG-3 is based primarily on juniper invasion of sagebrush communities, but also includes the low age-class diversity in sagebrush throughout its distribution.

Table VEG-3. Deviation (Low, Moderate, High) from Historic Range of Variation for the Bonneville Basin, Uinta Mountains and Wasatch Mountains of Northern Utah and for the Caribou National Forest.

Subject Area (Cover Type)	Wasatch Mountains	Bonneville Basin	Uinta Mountains	Caribou National Forest
Alpine	Low-Mod	Low	Low	*
Limber Pine/Bristlecone Pine	Low	Low	*	Low
Engelmann Spruce-Subalpine Fir				High
-High Elevation Spruce	*	*	Low	
-Spruce-Fir	Mod-High	**	Low-Mod	
-Subalpine fir	Moderate	*	*	
-Mixed Conifer	*Moderate*	*	Low-Mod	
Aspen				High
-Seral Aspen	High	High	High	
-Seral Aspen-Lodgepole	*	**	Mod-High	
-Climax Aspen	Low	**	Low-Mod	
Lodgepole Pine	Low-Mod	*	Low	Low
White Fir	Mod-High	Low	**	*
Interior Douglas-fir	Mod-High	Mod-High	Mod-High	Moderate
Pinyon-Juniper	Mod-High	High	Low-Mod (High)	High
Mountain Mahogany				Moderate
-Curlleaf	Low-Mod	Low-Mod	Low-Mod	
-Birchleaf (Alderleaf)	Low-Mod	Low-Mod	Mod-High	
Gambel Oak	Low-Mod *(High)*	Low-Mod	Low-Mod	*
Maple	Low-Mod	*	**	High
Mountain Brush	Low	Low	Low	Low
Tall Forb	High	Mod-High	Mod-High	High
Sagebrush Grasslands				Moderate
-Mountain Big Sagebrush	*Mod-High*	*Mod-High*	Low	
-Spiked Big Sagebrush	*Mod-High*	**	**	
-Wyoming Big Sagebrush	*	**	**	
Riparian	High	High		High
-Stream Canyon			Low	
-Subalpine Meadow			Mod-High	
Aquatic	Mod-High	High	Mod-High	

* Subject Area not present in assessment area.
** Subject Area not evaluated in this assessment due to lack of substantial distribution in the assessment area.

Environmental Consequences

Vegetation Cover Types and Properly Functioning Condition

Forest-wide, the following vegetation cover types are considered to be the furthest away from properly functioning conditions (PFC):

- Aspen (distribution and age class diversity);
- Douglas-fir (age class diversity);
- Oak (age class diversity);
- Pinyon-juniper (distribution and age class diversity);
- Sagebrush (age class diversity);
- Tall forb (distribution and composition); and
- Riparian (age class diversity and composition).

Table VEG-4a compares the current structural composition to the desired composition for the various forest types.

Table VEG-4a. Existing and desired conditions of various cover types by Ecological Section.

Cover Type	Desired Age Classes at PFC (Percent)	Existing Age Classes (Percent)	
		Overthrust Mountains	Uinta Mountains
Oak	SS – 30-50% IMM – 20-40% MAT – 20-40%	SS – 7% IMM – 18% MAT – 75%	SS – 7% IMM – 18% MAT – 75%
Aspen	GF, SS – 20-40% IMM – 20-40% MAT – 20-40%	GF, SS – 0% IMM – 1% MAT – 99%	GF, SS – 7% IMM – 1% MAT – 92%
Douglas-fir	GF – 5-15% SS – 5-15% IMM – 10-30% MAT – 10-30% OLD – 10-30%	GF – 0% SS – 0% IMM – 1% MAT – 99% OLD – 0%	GF – 0% SS – 0% IMM – 11% MAT – 89% OLD – 0%
Mixed Conifer Lodgepole	GF – 5-15% SS – 5-15% IMM – 10-30% MAT – 10-30% OLD – 10-30%	GF – 2% SS – 1% IMM – 3% MAT – 94% OLD – 0%	GF – 1% SS – 7% IMM – 10% MAT – 80% OLD – 2%
Spruce-Fir	GF – 5-15% SS – 5-15% IMM – 10-30% MAT – 10-30% OLD – 10-30%	GF – 0% SS – 0% IMM – 1% MAT – 1% OLD – 98%	GF – 0% SS – 0% IMM – 7% MAT – 6% OLD – 87%

Table VEG-4b compares the current structural composition to the desired composition for the sagebrush cover type Forest wide. Currently an estimated 5 percent of the sagebrush communities across the forest have low (<5%) crown cover, about 25 percent of the sagebrush communities have moderate (5-15 %) crown cover, and about 70 percent have high (>15%) crown cover. The desired conditions are to have about 5-15 percent of the sagebrush

communities across the forest with low (<5 %) crown cover, about 30-50 percent of the sagebrush communities with moderate (5-15 %) crown cover, and about 30-50 percent have high (>15%) crown cover.

Table VEG-4b. Existing and desired conditions of the sagebrush vegetation cover type across the Wasatch-Cache National Forest.

Cover Type	Existing Canopy Cover Classes (Percent)	Desired Age Classes at PFC (Percent)
sagebrush	low – 4% moderate – 21% high – 58%	low – 5-15% moderate – 30-50% high – 30-50%

These cover types are the primary focus of comparisons between alternatives when addressing PFC. Acres in existing wilderness and recommended wilderness, as well as those areas managed as undeveloped, affect the ways vegetation can be managed. Because mechanical treatment cannot be used in these areas, fire is the only tool available to modify existing condition.

Table VEG-5 lists various activities (prescribed fire, timber harvest, fuels treatment, and road construction) and their acres by alternative. This table is provided to show the potential impacts to vegetation age-class and patterns over the forest. The focus on treatments will be primarily on fire condition class 3 with some treatments likely to occur in Condition Class 2 as well. Condition Class 3 is defined as having significantly altered disturbance regimes, while Condition Class 2 is defined as having clearly evident, moderate modifications to disturbance regimes. These conditions classes are defined in more detail in Chapter 3, Topic 10 – Fire Management. Table FM-3 within the Topic 10 discussion describes the Fire Regimes and Condition Classes for the various cover types listed in Table VEG-5.

Evaluating the Movement Towards Properly Functioning Condition

Conifer, Oak and Aspen Cover Types

The Vegetation Dynamics Development Tool (VDDT) was used to model plant succession for conifer, aspen, and oak vegetation types for each alternative, which are characterized by different amounts of acres treated. This was used to estimate how each alternative moved the various vegetation types toward PFC in a 100-year period. VDDT is described in more detail in FEIS, Appendix B-1.

Table VEG-5 Comparison of treatments (prescribed fire, harvest, and mechanical fuels treatment) for each alternative over a 10-year period on the Wasatch-Cache National Forest.

Treatment	Vegetation Type	Alternatives							
		Total Acres	1	2	3	4	5	6	7
PRESCRIBED FIRE									
Prescribed Fire	Aspen & Aspen/Conifer	205,600	0	80,000	32,000	7,200	7,200	32,000	32,000
	Douglas-fir	87,500	0	4,000	2,000	0	0	2,000	2,000
	Sagebrush and Pinyon-Juniper	266,500	0	40,000	20,000	10,000	10,000	20,000	30,000
	Oak	90,800	0	40,000	20,000	8,000	20,000	20,000	8,000
Total Acres Treated by Prescribed Fire		650,400	0	164,000	74,000	25,200	37,200	74,000	72,000
HARVEST AND MECHANICAL TREATMENT									
Timber Harvest	**Aspen and Conifer Harvest**	556,600	0	6,500	7,500	12,500	15,500	5,000	8,500
Mech. Treatment	**Oak (fuels treatment)**	90,800	0	16,000	8,000	0	8,000	8,000	20,000
TOTAL ACRES TREATED									
Total Acres Treated (Harvest, Prescribed Fire, & Mechanical)			0	186,500	89,500	37,700	60,700	87,000	100,500
PERCENTATGE OF THE ACRES TREATED BY FIRE, HARVEST, AND MECHANICAL METHODS									
Of the Acres Treated, Percent Treated by Prescribed Fire			0%	88%	83%	67%	61%	85%	72%
Of the Acres Treated, Percent Treated by Timber Harvest			0%	3%	8%	33%	26%	6%	8%
Of the Acres Treated, Percent Mechanically Treated			0%	9%	9%	0%	13%	9%	20%

The VDDT model projects vegetation response to disturbance, as well as succession in the absence of disturbance, based on probability of occurrence. The disturbances may or may not actually occur as modeled, so the results are chiefly useful in comparing the overall results of an alternative, rather than identifying specific decades in which certain activities or disturbances occur. Management disturbances such as harvest or prescribed fire are dependent upon funding levels, which are not predictable over such long time periods. Natural disturbances such as insects and fires are more likely under certain stand conditions than under others, and the probability of occurrence will increase as more area develops those favorable conditions. But while the probability of their occurring may increase, the decade in which they occur is not predictable. The results of the model are useful because they reflect vegetation responses to the varying management emphases between the different alternatives. However, they should not be considered accurate predictors of stand development at a particular moment in time. In terms of development of PFC, the model indicates the likelihood that a given set of management practices

will lead toward PFC over the time period, but not that a particular vegetation type will meet PFC in a specific decade.

The VDDT model indicated that spruce-fir stands could be brought into PFC within 10 decades in all alternatives. However, the achievement of PFC is dependent upon significant acreages of spruce-fir being burned with prescribed and wildland fires. In the model, when mature forests receive a high intensity burn, the affected acres are moved into the grass/forb stage, where they remain for a relatively short period of time (usually 10 years) while regeneration is established. At the end of the time period, the acres move along the successional pathway to the seedling/sapling stage. This scenario is appropriate for most of the types modeled, but not for spruce-fir. Spruce stands are expected to quickly regenerate after fire when the fire is low intensity and leaves a scattered overstory to provide a seed source and protection for seedling establishment. However, a large stand-replacing fire (hundreds to thousands of acres) will create conditions which make spruce and fir regeneration very difficult. These species tend to occur at high elevations, and require substantial protection for seedling survival. They will not readily regenerate in large openings at high elevations, conditions that are created by large fires. In this situation, regeneration may take up to 50 years (not 10 years as described in the model) to become established and move into the seedling/sapling stage. So while the model is correct in showing the reduction of the mature and old stages resulting from large fires it underestimates the length of time to regenerate and develop the seedling/sapling stages. Therefore, the actual time to reach PFC may be several decades longer than predicted by the model.

The VDDT model also showed that the maximum acres of failed fire suppression per decade could vary significantly by alternative (Table VEG-6) based on treatments and subsequent successional pathways and changes in fire hazards. The amount of acres treated through timber harvest, mechanical oak treatment, and primarily prescribed fire including wildland fire use, either encourage or reduce fuel buildup and consequently change fire regimes and/or fire condition classes (Tables FM-1 and FM-2, Topic 10 – Fire Management). Because the values in Table VEG-6 were derived from a stochastic model, they can only be used to predict broad differences in failed fire suppression between alternatives, not actual impacts.

Table VEG-6. Results from the VDDT Model that show maximum acres of different vegetation types that are likely to burn in one decade forest-wide within the next 10 decades through failed fire suppression (rounded to the nearest 100 acres).

Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Aspen	5,100	3,100	4,200	4,400	4,000	4,100	4,200
All Conifer	79,000	22,500	23,400	11,600	13,600	27,000	27,000
Oak	3,300	6,000	1,900	5,600	3,500	3,000	4,100
Total	87,400	31,600	29,500	21,600	21,100	34,100	35,300

Sagebrush Cover Types

Outside of the VDDT model, an assessment of the succession of sagebrush, forest wide, was conducted given the forest wide conditions and acres treated per decade by alternative over the next 100 years. This assessment, which is not as complex in nature as VDDT, is more fully described in Appendix B-1.

These models included an increase in total acres of sagebrush as a result of conversion of juniper to sagebrush. Because of fire suppression, juniper has increased anywhere from 25 to 50 percent in its distribution on sites that were historically dominated by sagebrush. This sagebrush modeling shows that Alternatives 2 and 7 reach PFC within the 100 year modeling period. It would take more than 10 decades for any other alternative to achieve these conditions in the sagebrush communities.

General Alternative Comparisons

Alternative 1 has the least impact to existing successional pathways, but could vary the most from the historically natural successional pathways. This alternative has no timber harvest, prescribed fire, or mechanical treatment of vegetation. The only mechanism for plant succession would be failed fire suppression and continued succession along existing pathways. Because of historic fire suppression and subsequent fuels build-up, there will likely be new, uncharacteristically large insect and disease outbreaks resulting in a buildup of fuels in all the woody communities and as a result, uncharacteristically large and/or severe fires are the most likely to occur. As shown in Table VEG-6, Alternative 1 is likely to result in approximately 2 to 3 times more acres burned through failed fire suppression than any of the other alternatives, resulting in a greater potential for uncharacteristically large and intense fires. Under this alternative, the Uinta Mountains mixed conifer/lodgepole pine type is the only forest type to approximate PFC within 10 decades. The spruce-fir type is shown to reach PFC within decades, but that assumes burning extensive acreages. As noted above, however, the assumptions in the VDDT model were not accurate and it is not likely to reach these conditions within 10 decades. In addition, because of existing conditions resulting from historic livestock grazing impacts and lack of *active* restoration management in this alternative, some rangelands will take longer to recover than they would under Alternatives 2, 3, 6 and 7. Like Alternatives 2 and 6, no road construction or reconstruction would be allowed on over 600,000 acres. Of these acres, this alternative has recommended the largest amount (359,686 acres) as wilderness (MPC 1.5) in addition to the 309,079 acres of wilderness already occurring on the Forest. This limits the management tool to wildland fire use in moving plant communities toward PFC. Given the number of variables involved, movement toward PFC in all the above-listed cover types would be among the least predictable of all alternatives.

- Emphasis would be placed on allowing natural processes to move all vegetation types, without interference, toward PFC.

- Fires would be allowed to burn, where possible, as long as they avoid conflicts with human health and safety and property damage.

- Uinta Mountain mixed conifer/lodgepole type reaches PFC.

Alternative 2 proposes to treat the most total acres (Table VEG-4) including sagebrush, aspen, conifer, conifer-aspen, and oak. It emphasizes the restoration of terrestrial and aquatic habitat. It treats an average of 18,650 acres annually using fire, harvest, and mechanical treatments. Prescribed fire is used to treat approximately 88 percent of the total acres treated. As shown

through the VDDT model, this alternative moves all vegetation types except Douglas-fir to PFC within the 100-year projection time frame. Douglas-fir does not reach PFC within 10 decades, primarily because it will take longer than 100 years for the oldest structural stage to reach the desired percentage. Like Alternatives 1 and 6, no road construction or reconstruction would be allowed on over 600,000 acres. This alternative has 145,796 acres of recommended wilderness (MPC 1.5) in addition to the 309,079 acres of wilderness already occurring on the Forest. Wilderness status limits the management tools for moving plant communities toward PFC to wildland fire use, and fire use is limited by the ability to manage and control natural ignition burns.

- A priority for treatment in Alternative 2 would be the conversion of conifer-aspen communities back to aspen-dominated communities and to increase age-class diversity in aspen communities.

- Emphasis would be placed on sagebrush treatment, which would be the greatest of all alternatives and would result in this type reaching PFC within 3 decades.

- Fuels reduction in oak would be emphasized although Alternative 7 would treat slightly more acres to reduce fuels mechanically than Alternative 2. This alternative would emphasize mechanical treatment until fire can be safely used to not only maintain fuels but also increase age class diversity.

- Harvest of conifers would be allowed, but would play an insignificant role in moving vegetation diversity toward PFC.

- Removal of conifers that have invaded willow-dominated riparian areas, especially on the north slope (e.g. Middle Fork Beaver Creek), would be emphasized where riparian function has been altered by the invasion of these conifers.

- Maintenance of the wildlife corridor connecting the northern Rocky Mountains with the central and ultimately the southern Rocky Mountains would be emphasized through selection and group selection harvest methods in spruce-fir communities to minimize insect and disease outbreaks.

- Achieves PFC for all types except Douglas-fir.

Alternative 3 has less than half the acres as Alternative 2, but like that alternative relies heavily on the use of prescribed fire to move vegetation toward PFC. This alternative has fewer acres in MPC 5.2 than does Alternative 4. The VDDT model showed this alternative moves oak, aspen and mixed conifer/lodgepole to PFC. All other types across the forest would take more than 10 decades to reach PFC. No road construction or reconstruction would be allowed on over 430,000 acres. This alternative has 51,113 acres of recommended wilderness (MPC 1.5) in addition to the 309,079 acres of wilderness already occurring on the Forest. As noted above, wilderness status limits the management tools for moving plant communities toward PFC to wildland fire use, and fire use is limited by the ability to manage and control natural ignition burns.

- Although Alternative 3 treats less than half the acres than Alternative 2, a primary effort would be on the conversion of conifer-aspen communities back to aspen-dominated communities and to increase age-class diversity in aspen communities through the use of fire and harvest treatments.

- An effort would be placed on fuels reduction in oak and increasing age class diversity.

- Maintains the wildlife corridor connecting the northern Rocky Mountains with the central and ultimately the southern Rocky Mountains by taking actions to minimize insect and disease outbreaks.

- Moves oak, aspen and mixed conifer/lodgepole types to PFC.

Alternative 4 is second only to Alternative 5 in the harvest of aspen and conifer, yet treats the least amount of acres, overall, than any other alternative. Many of the acres of MPC 3.2 in Alternatives 6 and 7 are MPC 5.2 in this alternative, focusing on the commercial harvest of trees (less than Alternative 5, but more than other alternatives) rather than the restoration of ecosystem functions. Timber harvest would play an insignificant role in moving vegetation diversity toward PFC. This alternative treats the fewest acres through prescribed fire than any other alternative, and does not mechanically treat oak. Like Alternative 7, this treats an average of 800 acres of oak each year through prescribed fire. It prohibits high intensity prescribed fire in conifer-dominated mixed aspen stands within 5.2 and 6.2 MPCs, but does allow just over 700 acres of conifer-aspen communities in other MPCs to be burned through prescription each year. Approximately 1,000 acres of sagebrush would be burned each year, half that of Alternatives 3 and 6, one-third that of Alternative 7, and one-fourth that of Alternative 2. No vegetation cover types reach PFC within 10 decades. This alternative also has no acres of recommended wilderness and road construction or reconstruction would be allowed on about 119,000 acres, which would allow for the greatest access for harvest.

- A priority in Alternative 4 would be to maximize commodity production. Timber harvest would be less than Alternative 5, but greater than all other alternatives.

- Sagebrush treatment would be one forth that of Alternative 2, and would be done primarily to improve forage production in existing allotments.

- Like Alternatives 3 and 6, this alternative would emphasize treatment of oak through prescribed fire and mechanical treatments to reduce fuels.

- Does not reach PFC.

Alternative 5 designates more of the lands on the North Slope and in the Bear River Range as MPC 5.2 than any other alternative, therefore focusing more on commodity production than any other alternative, and the least on ecosystem restoration. This alternative has over twice the acres of harvest of aspen and conifer than Alternatives 2 and 3, just less than twice that of Alternative 7, and more than three times that of Alternative 6. Insects and disease would be

controlled Forest-wide to maintain growth of trees in the suitable timber base. Like Alternative 4, this alternative prohibits high intensity prescribed fire in conifer-dominated mixed aspen stands within MPC 5.2 and 6.2, but does allow just over 700 acres of conifer-aspen in other MPCs and approximately 1,000 acres of sagebrush communities to be burned through prescription each year. It allows for treatment of oak communities through fire and mechanical methods at the same levels as Alternative 3 and 6, but half that of Alternative 2. With the exception of oak communities of the Overthrust Mountains Section, which reach PFC within 2 decades according to the VDDT model, no vegetation type forest wide reaches these conditions within 10 decades. Like Alternative 4, this alternative has no acres of recommended wilderness (MPC 1.5); road construction or reconstruction would be allowed on just over 108,000 acres. Existing wilderness on the forest, as mentioned above, is 309,079 acres, which would allow for nearly as much access for timber harvest as Alternative 4.

- A priority in Alternative 5 would be to maximize commodity production. Harvest of conifers would be the greatest of all alternatives, but would play an insignificant role in moving vegetation diversity toward PFC.

- Sagebrush treatment would be one forth that of Alternative 2, and would be done primarily to improve forage production in existing allotments.

- Like Alternatives 3 and 6, this alternative would emphasize treatment of oak through prescribed fire and mechanical treatments to reduce fuels.
- Oak type reaches PFC.

Alternative 6, while similar to Alternative 2 in philosophy, takes a more conservative approach to the restoration of PFC, treating about half the acres annually as Alternative 2. It focuses on maintaining the north-south wildlife corridor; converting conifer-invaded aspen communities back to aspen, and sagebrush and oak age class diversity. This alternative uses both timber harvest and fire in assisting the movement toward PFC. This alternative moves oak, aspen, and mixed conifer/lodgepole to PFC within the 100-year period. No other types, forest wide, reach PFC within 10 decades.

- A priority in Alternative 6 would be to increase age-class diversity in aspen communities and to move conifer-aspen communities to back to aspen-dominated communities.

- Sagebrush treatment would be half that of Alternative 2, but would be the same as Alternative 3 and twice that of Alternatives 4 and 5.

- Like Alternatives 3 and 5, this alternative would emphasize treatment of oak through prescribed fire to increase age class diversity. Mechanical fuels treatment would be half that of Alternative 2 and less than half that of Alternative 7.

- Harvest of conifers would be allowed but, with the exception of Alternative 1, would play the least significant role in moving vegetation diversity toward PFC.

- Like Alternative 2, maintenance of the wildlife corridor connecting the northern Rocky Mountains with the central and ultimately the southern Rocky Mountains would be emphasized through selection and group selection harvest methods in spruce-fir communities to minimize insect and disease outbreaks.

- Oak, aspen, sagebrush and mixed conifer/lodgepole types reach PFC.

Alternative 7 uses timber harvest, mechanical treatment, and fire in assisting the movement toward PFC. While not moving all plant communities toward PFC forest-wide, this alternative focuses on restoration of the most significant landscapes for wildlife purposes. This alternative more than doubles the acres of oak treated mechanically to reduce fuels along the urban interface rather than relying on prescribed fire to move this type toward PFC. With the exception of Alternative 2, this alternative treats more acres of sagebrush and pinyon-juniper than any alternative, and the sagebrush type reaches PFC within 3 decades forest wide. Oak, aspen and mixed conifer/lodgepole reach PFC within the period. All other types, forest wide, do not reach PFC within 10 decades.

- A priority in Alternative 7 would be to increase age-class diversity in aspen communities and to move conifer-aspen communities to back to aspen-dominated communities.

- Sagebrush treatment would be less than Alternative 2, but would be greater than all other alternatives.

- Alternatives 7 would emphasize the mechanical treatment of oak (greater than all other alternatives) to reduce fuels along the urban interface and to move this type toward PFC.

- Harvest of conifers and aspen would be allowed and would play a minor role in moving vegetation diversity toward PFC.

- Like Alternatives 2 and 6, maintenance of the wildlife corridor connecting the northern Rocky Mountains with the central and ultimately the southern Rocky Mountains would be emphasized through selection and group selection harvest methods in spruce-fir communities to minimize insect and disease outbreaks.

- Oak, aspen and mixed conifer/lodgepole reach PFC.

Summary of Alternative Comparisons

The differences between alternatives and their probability of reaching properly functioning condition are shown in Table VEG-7. Alternative 2 shows the greatest likelihood for all cover types except Douglas-fir for reaching PFC within 10 decades. Alternative 5 shows the least accomplishment in reaching PFC because most vegetation treatment is by timber harvest, which does not affect vast amounts of acres as fire.

Table VEG-7 Cover types in the Uinta Mountains and Overthrust Mountains Sections reaching Properly Functioning Condition within 10 Decades

Cover Types	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5	ALT 6	ALT 7
Sagebrush[1]	Yes	Yes	No	No	No	No	Yes
Oak	No	Yes	Yes	No	Yes[3]	Yes	Yes
Aspen	No	Yes	Yes	No	No	Yes	Yes
Douglas-Fir	No	No	No	No	No	No	No
Mixed Conifer Lodgepole	Yes [2]	Yes	Yes	No	No	Yes	Yes
Spruce Fir	No	Yes	No	No	No	No	No

[1]Modeled outside VDDT
[2]Uinta Mountain section only
[3]Overthrust Mountain section only

Effects on Vegetation Communities from Roads and Access Management

In general, effects from travelways are direct and result in the loss of cover types and an increase in fragmentation of plant communities. The greatest effect is from the application or not of the new Roadless Rule (which is discussed in detail in **Effects on Vegetation Communities from Roadless Area Management**) and/or the road construction that will be used to treat various vegetation communities through timber harvest and prescribed fire. Roads provide access for vehicles that may carry noxious weed seeds into the forest. The greater the miles of open road, the greater the likelihood of new infestation areas.

In Alternative 1 the new Roadless Rule applies so inventoried roadless areas would remain roadless and no new roads or motorized trails would be built under any management prescription category (MPC) except in Concentrated Development Areas (MPC 8). The effects of this alternative, which are increased age of forested communities and an increase in susceptibility to insects, disease, and failed fire suppression, are more related to the associated lack of vegetation treatment than the lack of road or motorized trail construction. Impacts from travelways, therefore, would be the least of all alternatives. No additional fragmentation of habitat is anticipated and new noxious weeds infestations would be minimized, based on fewer miles of travelways which act as conduits for the expansion of weed populations. Hiking trails would be allowed, as in all other alternatives.

This alternative would have greater effects from roads than Alternative 1. Active restoration activities outside inventoried roadless would permit timber harvest and associated road construction and reconstruction of approximately 6 miles. However, harvest activities would use existing roads, limiting disturbance to reconstruction of existing roads. This may result in a very slight reduction in vegetated lands where reconstruction includes realignment or widening. Road improvements may encourage vehicle travel, which may in turn increase the transport of noxious weed seeds, requiring eradication efforts on additional acres.

Alternative 2 adjusts generally allowed activities for management prescriptions with application of the National Roadless Area Conservation Rule. Road construction and reconstruction are not allowed in inventoried roadless areas nor is cutting, sale, and removal of timber except: for the cutting, sale or removal of generally small diameter trees which maintains or improves roadless characteristics and: 1) to improve habitat for threatened, endangered, proposed, or sensitive species; or 2) to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. About 145,900 acres or 24% of inventoried roadless areas are recommended for wilderness.

The new Roadless Rule does not apply, however, Alternative 3 emphasizes reducing adverse impacts from roads. With limited area in MPC 5.2, the likelihood of new construction is less than Alternatives 4 and 5, significantly greater than Alternative 2. Road construction would require approximately 39 miles of new roads, with a corresponding loss of vegetation and increase of potential noxious weed infestations.

In Alternative 4 the new Roadless Rule does not apply. New roads and motorized trails could be built everywhere but in existing wilderness, some special management area prescriptions (MPCs 2.1, 2.4, 2.6 and 2.7), and some recreation prescriptions (MPCs 4.1 and 4.2). New construction required to meet management direction would total an estimated 49 miles. This would increase the acreage dedicated to roads and the probability of noxious weed infestations.

In Alternative 5 the new Roadless Rule does not apply. New roads and motorized trails could be built everywhere but in existing or proposed wilderness, some special management areas prescriptions (MPCs 2.1, 2.4, 2.6 and 2.7), and some recreation prescriptions (MPCs 4.1 and 4.2). The miles of road needed are the same as in Alternative 4. However, this alternative has the largest acreage in MPC 5.2, and would therefore have the highest probability of road construction with an estimated 49 miles for timber harvest and an additional 14-15 miles for oil and gas exploration and development. Impacts from travelways, therefore, would greater than all other alternatives. This alternative would have the greatest the probability of noxious weed infestations from the establishment of new vectors for invasions of these species.

In Alternative 6 the new Roadless Rule does apply so no new road construction in inventoried roadless areas could occur. Because most of the area outside inventoried roadless is adequately roaded, reconstruction would be the major impact to vegetation. Approximately 6 miles of new timber harvest roads would be constructed and approximately 10 miles of roads would be constructed for oil and gas exploration and development. Potential for noxious weed infestations would be slightly more than Alternative 1, similar to Alternatives 2 and 7, but significantly less than Alternatives 3, 4, and 5.

In Alternative 7 the Roadless Rule does not apply so no new road construction in inventoried roadless areas could occur. Approximately 6 miles of new timber harvest roads would be constructed and approximately 11.5 miles of roads would be constructed for oil and gas exploration and development. Potential for noxious weed infestations would be slightly more than Alternative 1, similar to Alternatives 2 and 6, but significantly less than Alternatives 3, 4, and 5.

Effects on Vegetation Communities from Timber Harvest

Forest health has been affected by a history of fire suppression on the forest as well as through practices such as tie hacking, clear-cutting spruce-fir, and by harvesting very small units in areas that historically burned in relatively large patches. And while timber harvest and fire have played a role in maintaining some age-class diversity and distribution (patterns) of the plant communities across the Forest, these have had a limited effect. Timber harvest is used in varying degrees in each alternative. Table VEG-4 includes the acres by alternative that would be treated

through timber harvest as well as through prescribed fire, which is discussed in detail below. Timber harvest does not play a significant role in moving vegetation toward PFC under any alternative because of forested acres in lands withdrawn from timber management as well as those lands within various management prescriptions that do not allow timber harvest. This tool can, however, play an important role in maintaining wildlife corridors, and moving smaller scale (watersheds and/or landscapes) toward PFC.

Alternative 1 does not allow for timber harvest in managing forest ecosystems and does not allow the building of any roads. The lack of active management, coupled with a lack of prescribed fire would increase the likelihood of insect epidemics and disease spread. There would be a continued conversion of aspen- to conifer-dominated stands as well as a movement toward older age classes and toward uncharacteristically large fires forest-wide.

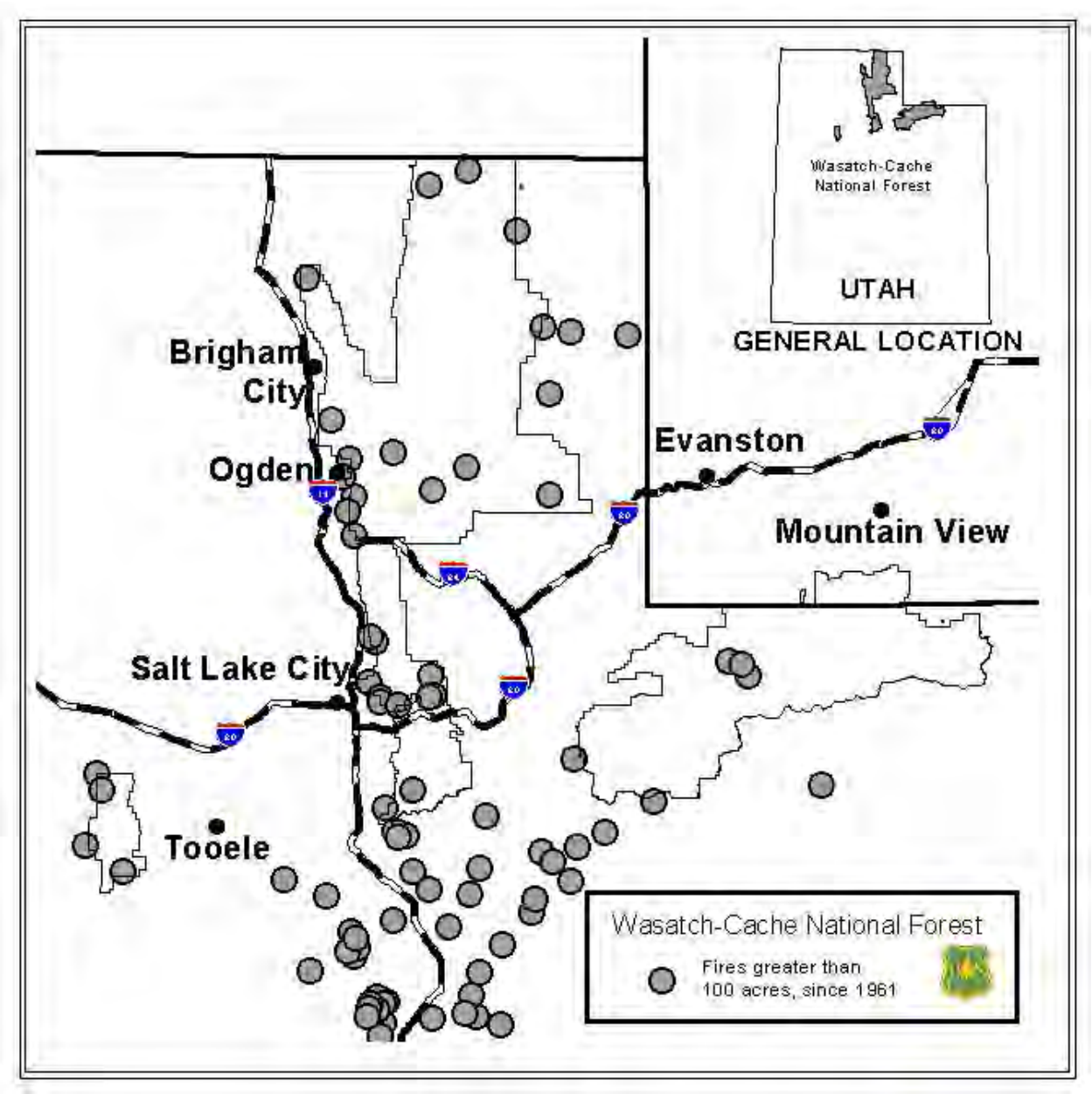
As shown in Table VEG-4 above, Alternative 2 allows for the harvest of 6,500 acres of conifer and aspen-conifer communities over the 10-year planning period, or approximately 650 acres each year. This is more than Alternative 7 and Alternative 1, which does not allow for timber harvest, but somewhat less than Alternatives 3 and 6. It is nearly half those acres harvested in Alternative 4 and less than half of the acres harvested in Alternative 5. Timber harvest would contribute an important, but relatively small component of moving these forested types toward PFC. This Alternative relies more heavily on prescribed fire to move toward these conditions. Alternative 3 allows for slightly more timber harvest than Alternative 2. Approximately 750 acres of aspen and conifer would be harvested each year. Alternative 4 focuses more on timber harvest with approximately 1,250 acres of aspen and conifer harvested each year. Alternative 5 provides the greatest level of timber harvest; nearly 1,600 acres of aspen and conifer would be harvested each year, which is greater than all other alternatives and more than twice the acres harvested in Alternatives 2, 3, and 7. Alternative 6 would harvest almost 900 acres of aspen and conifer each year, while Alternative 7 would harvest 500 acres each year.

Effects on Vegetation Communities from Fire Management

Currently there is a relative abundance of mature and older age classes in all vegetation types. For example, in the Wasatch-Cache National Forest portion of the Overthrust Mountains Section, nearly all of the Aspen, 82 percent of Bear River mixed conifer and Lodgepole, 93 percent of Spruce-fir, 89 percent of Douglas-fir types are in mature to old age-class categories. The pattern is much the same for the Uinta Mountains Section and Stansbury Mountains portion of the Bonneville Basin Section. These older age classes are more susceptible to beetle impacts than the younger age classes. Because of the lack of vegetation treatment, including the use of prescribed fire, there has been an increase the likelihood of insect epidemics and disease spread. Fire has played a role in maintaining some age-class diversity and distribution of some of the vegetation communities across the Forest, although fire suppression has limited this effect. The following map (Figure VEG-2) shows ignitions from 1961 to present that resulted in more than 100 acres being burned. Many of these fires burned at lower elevations on the Forest. Fires of this size are considered to have important effects on age class diversity in a variety of vegetation cover types across the forest. Most of the fire occurrences on the forest during this period were less than 1 acre in size, often human-caused and often along travelways. Because these human-caused fires typically burn in small areas and often in areas that have recently burned, they play

only a minor role in establishing a range of age class diversity in any vegetation cover type. In fact, many of these areas that burn frequently at lower elevations are currently dominated by non-native species such as cheatgrass and various noxious weeds. Table VEG-4 shows the acres of vegetation treated through prescribed fire and Table VEG-6 shows the potential for failed fire suppression by alternative as identified by the VDDT model.

Figure VEG-2. Fires since 1961 that burned at least 100 acres across the Wasatch-Cache National Forest.



Under Alternative 1 movement toward PFC would be the least predictable of any alternative and would depend on the number of acres burned by the combination of failed fire suppression, and wildland fire use. As shown in Table VEG-4, no acres would be harvested, mechanically

treated, or burned under prescription. Any change in vegetation structure would be the result of insects and disease, windthrow, and fires. Because of historic fire suppression, an unnatural build-up of fuels has occurred which will likely result in uncharacteristically large and severe fires than occurred historically. The VDDT model predicted the greatest potential for failed fire suppression (Table VEG-6).

Alternative 2, as shown in Table VEG-4, treats the greatest number of acres using prescribed fire, more than twice the acres of Alternatives 3, 6, and 7, over four times that of Alternative 5 and more than 6.5 times that of Alternative 4. The oak and aspen and sagebrush types reach PFC in two to three decades under this alternative, and a majority of the treatments (88 percent of the acres treated) are through prescribed fire. The mixed conifer–lodgepole types would reach PFC within 6 decades in the Wasatch-Cache portion of the Overthrust Mountains Section and within 10 decades in the Uinta Mountains Section. An average of 4,000 acres of oak, 4,000 acres of sagebrush and pinyon-juniper, 8,000 acres of aspen and aspen/conifer mix, and 400 acres of Douglas-fir would be burned annually. For oak, significantly less than 4,000 acres would be burned in the first portion of the first decade, while more would be burned as the decade progressed.

Alternative 3, like Alternatives 6 and 7 as shown in Table VEG-4 above, is very active in managing for ecosystem diversity through the use of many available tools. An average of 2,000 acres of oak, 2,000 acres of sagebrush and pinyon-juniper, 3,200 acres of aspen/conifer mix, and 200 acres of Douglas-fir (this is mechanical and prescribed fire) would be burned annually. Less than 2,000 acres of oak would be burned in the first portion of the first decade, while more would be burned as the decade progressed. Treatments in the Stansbury Mountains would include some additional acres of sagebrush and pinyon-juniper treated each year. In the Wasatch-Cache portion of the Overthrust Mountains Section prescribed fire plays the predominant role in oak and aspen vegetation communities reaching PFC within 5 decades. The VDDT model shows that spruce-fir reach PFC within 4 to 6 decades, but as noted above in **General Alternative Comparisons**, this assumes that large-scale fires (several hundred to several thousand acres in size) would allow spruce and/or fir to regenerate within 10 years, which does not happen at the high elevations where this type occurs. In the Wasatch-Cache portion of the Uinta Mountains Section the mixed conifer – lodgepole types reach PFC within 5 decades and the aspen within 9 decades. No other vegetation types reach PFC within 10 decades.

Alternative 4 has the least amount of fire of all alternatives. An average of 1,000 acres of sagebrush, 800 acres of oak, and 720 acres of aspen would be burned annually. Alternative 5 is similar, except it allows for an average of 2000 acres of oak to be burned annually. And, like Alternatives 3 and 6, less than 2,000 acres of oak would be burned in the first potion of the first decade and more would be burned as the decade progressed.

Alternative 5 is similar to Alternative 4 in its treatment through prescribed fire, but treats an average of 2,000 acres rather than 800 acres per year of oak. And, with the exception of the oak type, which reaches PFC within 2 decades, no vegetation type reaches PFC within 10 decades.

Alternative 6, like Alternative 3, would provide for movement toward PFC by primarily relying on fire but also using timber harvest practices as well. And like Alternative 3, this alternative

would annually burn an average of 2,000 acres of oak, 2,000 acres of sagebrush and pinyon-juniper, 3,200 acres of aspen/conifer mix, and 200 acres of Douglas-fir. Less than 2,000 acres of oak would be burned in the first portion of the first decade, while more would be burned as the decade progressed. In the Wasatch-Cache portion of the Overthrust Mountains Section, oak would reach PFC within 2 decades, mixed conifer – lodgepole within 3 decades, and aspen and spruce-fir within 9 decades. In the Wasatch-Cache portion of the Uinta Mountains Section, aspen would reach PFC within 8 decades and mixed conifer – lodgepole within 10 decades. No other types would reach PFC within 10 decades.

Approximately 72% of the total acres treated are treated through prescribed fire and wildland fire use to move the vegetation toward PFC. This alternative would burn an average of 800 acres of oak each year, 3,000 acres of sagebrush and pinyon-juniper, 3,200 acres of aspen and aspen/conifer mix, and 200 acres of Douglas-fir. In the Wasatch-Cache portion of the Overthrust Mountains Section, all vegetation types reach PFC, with the exception of Douglas-fir, within 10 decades. Oak reaches PFC here within 2 decades, mixed conifer within 3 decades, and aspen and spruce-fir within 9 decades. Like Alternative 6, in the Wasatch-Cache portion of the Uinta Mountains Section, aspen reaches PFC within 8 decades, and mixed conifer – lodgepole within 10 decades. Forest wide, sagebrush would reach PFC within 3 decades.

Effects on Vegetation Communities from Mechanical Vegetation Treatment

Mechanical vegetation treatments would be focused primarily on the oak type along the urban interface of the forest where fire hazards have the greatest potential to result in property damage. It would occur, to some degree, elsewhere in other cover types (e.g. Douglas-fir, sagebrush, and mountain brush) to provide for more natural fire hazard conditions, but these would be determined at a project level and are not described here.

Alternatives 1 and 4 would not allow for mechanical treatment of oak communities and, therefore, have the least impact on hazardous fuels. Alternatives 3, 5, and 6 would have an intermediate effect by allowing an average of approximately 800 acres mechanically treated per year. Alternative 2 would allow for an average of approximately 1,600 acres per year to be mechanically treated, while Alternative 7 would reduce fuels hazards the most, by allowing an average of 2,000 acres per year to be mechanically treated.

Effects on Vegetation Communities from Recreation

Effects on vegetation may result from various forms of recreation use, but are most prominent in areas of high undeveloped camping, in development of new roads, trails and facilities, and especially from unauthorized summer OHV use. Unauthorized OHV use occurs throughout the forest, but is most prominent in the North Wasatch-Ogden Valley and Cache-Box Elder Management Areas. It also occurs in the Central Wasatch Management Area, primarily along the Davis County foothills. This unauthorized use occurs to a greater degree during the hunting season in the Western Uinta and Eastern Uinta Management Areas. The effect of these activities is a disturbance and loss of native perennial vegetation on uplands and riparian/wetland areas. In association is watershed disturbance (ground cover loss and soil compaction), spread of noxious weeds, and wildlife habitat disturbance. The management of these activities, outside direction in

existing district travel plans, is not addressed in this document. Commonly associated with high recreation use, especially along the foothills and lower elevations of the forest, are human ignitions of unwanted fires. Ski area expansions and allowed activities in ski areas, the development of new recreation trails and/or recreation facilities, could potentially have a localized impact through type conversion and associated alteration of vegetation composition and structure, and associated wildlife habitat functions.
Alternatives 1, 2, 3, 4, 6 and 7 would have no impacts to vegetation from ski area development outside currently permitted boundaries because they do not allow expansion of resort boundaries; Alternative 5 would have the greatest impact because it allows for new ski areas as well as ski area expansions.

Alternative 1 maintains the greatest number of acres of non-motorized lands (Table 2-4) and roadless area values (Table 2-6). Only 3 miles of new roads are projected to be constructed for oil and gas development (Table 2-2), which if managed as open, could allow for greater recreation access. No new trails would be developed. Existing trails and roads could only be relocated to repair environmental concerns. Unlike all other alternatives, no additional developed recreation sites would be allowed. In addition, like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. Approximately 2 miles of existing roads and 76 miles of trails would be closed to motorized access as a result of wilderness recommendations. This reduced access and lack of development is likely to minimize unauthorized OHV use on the Forest, which would result in the least potential for disturbance and loss of native perennial vegetation from these activities. The lower potential for unauthorized OHV use and the limited development of new facilities, including trails would likely result in the fewest acres disturbed. In addition, the focus on repairing environmental concerns could enhance the existing conditions. Because no new roads would be established in roadless areas, no trails would be constructed, and no recreation sites would be developed, this alternative would have the least potential impacts on vegetation communities from recreation management.

Alternative 2, like Alternatives 6 and 7, maintain approximately 60 percent of the Forest as non-motorized (Table 2-4) and maintain nearly as many acres for roadless area values as Alternative 1 (Table 2-6). This Alternative would close about 7 miles of trails to motorized access as a result of wilderness recommendations. And like Alternative 1, this alternative would likely maintain lower access for unauthorized OHV use. A total of approximately 9 miles of roads would be built for timber harvest and oil and gas exploration, which if managed as open, could allow for increased recreation access. Some new trails could be developed and existing trails and roads could be relocated to repair environmental concerns. Some additional recreation facilities would be allowed consistent with prescription. Like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. This alternative would have greater impacts on vegetation communities from recreation management (new developed recreation sites) than Alternative 1, but less than all other alternatives because of the greater potential for unauthorized OHV access as well as the direct effects of a loss of vegetation to road and trail development. Like Alternative 1, however, this alternative would have one of the lowest potentials for disturbance and loss of native perennial vegetation from recreation management.

Alternative 3 maintains nearly as many acres of non-motorized use as Alternatives 2, 6, and 7 and maintains or mostly maintains twice as many acres for roadless values as Alternatives 6 and 7, but less than Alternatives 1 and 2. Like Alternatives 4, 5, 6 and 7, no miles of existing trails would be closed to motorized use from wilderness recommendations. Approximately 39 miles of roads could be constructed for timber harvest and 10 miles for oil and gas exploration and development (Table 2-2), which if managed as open, could increase the potential for recreation access. Unauthorized OHV use would likely be greater than in Alternative 1 and about the same as Alternatives 2, 6, and 7 because of the amount of non-motorized acres. This alternative would have a moderate potential for disturbance and loss of native vegetation from this use. New trail development could be allowed and existing trails and roads would be relocated to repair environmental concerns. Some additional recreation facilities would be allowed consistent with MPCs. Like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. Overall, this alternative would have greater potential impacts on vegetation communities from recreation management than Alternatives 1 and 2, but less than Alternatives 4, 5, 6, and 7.

Alternative 4 maintains the least amount of non-motorized areas, and allows approximately 49 miles of new road construction for timber harvest (Table 2-2), which could increase the potential for recreation access. Unauthorized OHV use would likely be the same as Alternative 3, less than Alternative 5, and greater than Alternatives 1, 2, 6, and 7. This alternative would have the same potential for disturbance and loss of native vegetation from this use as Alternative 3, less than Alternative 5, and more than all other alternatives. Like Alternatives 3, 5, 6, and 7, no miles of existing trails would be closed to motorized use from wilderness recommendations. New trail construction would be allowed to meet demand and would be restricted primarily by budgets. Additional recreation facilities would be allowed consistent with MPCs, but like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. This alternative would have similar impacts on vegetation communities from recreation management as Alternative 5, and more than all other alternatives.

Alternative 5, maintains more non-motorized acres than Alternative 4, but allows the greatest amount of new road construction (49 miles for timber harvest and 14-15 miles for oil and gas exploration and development – Table 2-2). Because of this, unauthorized OHV use would likely continue, and the potential impacts to existing native plant communities would be the greatest of all alternatives. New trail construction would be allowed consistent with MPCs. Additional recreation facilities would be allowed to expand and accommodate demand for multiple-use. Roads would be reconstructed and new roads developed for resource development could be left open. This alternative would also allow for ski area expansion, which would not occur under any other alternative. This alternative would have less impacts in the form of disturbance and loss of native vegetation from recreation management than Alternative 4, but greater than all other alternatives.

Alternative 6 would maintain about the same amount of non-motorized acres as Alternatives 2, 3, and 7, less than Alternatives 1 and 2, and more than Alternatives 4 and 5. Because of this there would be a relatively low potential for additional access by unauthorized OHV use and resulting disturbance and loss of native vegetation. New trail construction would be allowed consistent with watershed, MPCs, and biodiversity goals. More emphasis would be on realignment of existing trails causing watershed and other undesirable impacts. Additional recreation facilities

would be allowed consistent with ROS, but like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. This alternative would have fewer impacts in the form of disturbance and loss of native vegetation from recreation management than alternatives 3, 4, and 5, but more than alternatives 1 and 2.

Alternative 7 would maintain or mostly maintain about the same amount of non-motorized acres as Alternatives 2, 3, and 6, less than Alternatives 1 and 2, and more than Alternatives 4 and 5. Approximately 7 miles of new roads could be constructed for timber harvest and about 11.5 miles for oil and gas exploration and development (Table 2-2). Like Alternative 6, there would be a relatively low potential for additional access by unauthorized OHV use and resulting disturbance and loss of native vegetation. New trail construction would be allowed consistent with watershed and biodiversity goals. More emphasis would be on realignment of existing trails causing watershed and other undesirable impacts. Unauthorized OHV use and the resulting potential loss and disturbance to native vegetation would likely be about the same as Alternative 3, more than Alternatives 1, 2 and 6, and less than Alternatives 4 and 5. This unauthorized use would result in the loss of and disturbance to native vegetation. Additional recreation facilities would be allowed consistent with ROS, but like all alternatives except Alternative 5, no expansion of ski area boundaries is allowed. Overall, this alternative would have fewer impacts on vegetation communities from recreation management than Alternatives 3, 4 and 5, but would be slightly more than alternatives 1, 2 and 6.

Effects on Vegetation Communities from Livestock Grazing

The standards and guidelines in the Rangeland Health Amendment to the Wasatch-Cache Land and Resource Management Plan (USDA Forest Service 1996) are applied to all alternatives. Alternatives 1, 2, 3, and 6 subtract acres of capable rangeland in unsatisfactory condition from suitable acres. This, along with vegetation treatments (primarily prescribed fire in aspen and sagebrush or mountain brush) could result in a range of improvements of vegetation conditions depending on factors discussed below. Alternative 7 applies a lower forage utilization guideline to rangelands in unsatisfactory condition, which could result in a more consistent improvement of vegetation conditions in riparian areas as well as uplands. The primary difference between alternatives for effects on vegetation communities other than this is the status of vacant allotments (vacant allotments closed or vacant allotments left open for potential use), which are also discussed below.

Effects on vegetation communities from removal of areas in unsatisfactory condition from suitable acres would vary across the forest because of site-specific factors. Areas in unsatisfactory condition that can be easily avoided through livestock herding, and/or salting would be most likely to improve in ground cover and species composition over the long-term. Areas that are fenced or can be fenced would also be likely to improve if removed from livestock grazing. Areas in unsatisfactory condition that are relatively small, scattered, or in locations where it is difficult to avoid grazing without expensive structural improvements (fence construction) would be much less likely to improve in ground cover and/or species composition. Given that acres for this analysis were extrapolated forest-wide from areas with monitoring, the relative proportions of the above conditions are unknown. There would likely be a range of improvement probability that can only be predicted with site-specific assessment. Alternatives 1,

2, and 6 would result in this range of improvement on a total of 18,300 upland and riparian acres and Alternative 3 would result in 2,100 acres with a range of improvement on riparian acres.

Alternatives 4 and 5 do not remove areas in unsatisfactory condition nor do they implement a lower forage utilization allowance for these areas. Some improvement of these areas is expected through implementation of management direction from the 1996 Rangeland Health Amendment, however it is expected that it would be more gradual and less consistent than in any of the other Alternatives.
In Alternative 1 all vacant allotments are closed and removed from allotment status. The effects on vegetation communities would be continuation of ungrazed conditions, which generally depend on the degree of recovery from any historic grazing impacts and the role fire has played in a given area. Species composition and ground cover within these ungrazed areas would continue to be affected by wildlife use, recreation and wildfire.

As in Alternative 1, all vacant allotments are removed from allotment status in Alternative 2 with similar effects except that Alternative 2 includes use of prescribed fire to reduce brush canopy cover and increase ground cover so vegetation conditions would remain ungrazed. Since the specific locations of future prescribed fire projects are unknown, the degree to which prescribed fire would be used within these closed vacant allotments is unknown.

In Alternative 3 vacant allotments remain vacant or could be used, primarily as grazing areas where existing allotments, or portions of allotments, need rest as a part of management activities (e.g. prescribed fire, wildland fire use, etc.). However, given available resources to conduct necessary analyses prior to reintroducing grazing to these areas, it is unlikely that these vacant allotments would be stocked during the planning period. Short term, the effects on vegetation communities would be that they would remain in an ungrazed condition and might be improved through prescribed fire.

In Alternative 4 vacant allotments would be addressed on a case-by-case basis. Some could be reopened while others might be used where existing allotments, or portions of allotments, need rest as a part of management activities. However, given available resources to conduct necessary analyses prior to reintroducing grazing to these areas, it is unlikely that these vacant allotments would be stocked during the planning period. Short term, the effects on vegetation communities would be that they would remain in an ungrazed condition.

In Alternative 5 vacant allotments could be stocked. However, given available resources to conduct necessary analyses prior to reintroducing grazing to these areas, it is unlikely that these vacant allotments would be stocked during the planning period. Short term, the effects on vegetation communities would be that they would remain in an ungrazed condition.

Alternative 6 closes only the three vacant allotments in the Eastern Uinta Mountains Management Area for bighorn sheep habitat. All other vacant allotments would be evaluated on a case-by-case basis and would either be removed from allotment status or would be used where there is an opportunity to improve conditions on other allotments by spreading out use. However, given available resources to conduct necessary analyses prior to reintroducing grazing to these areas, it is unlikely that these vacant allotments would be stocked during the planning

period. Short term, the effects on vegetation communities would be that they would remain in an ungrazed condition.

Alternative 7 closes three vacant allotments in the Eastern Uinta Mountains Management Area for bighorn sheep habitat and five vacant allotments in the Salt Lake County and Davis County watersheds to protect watershed values. The effects on vegetation communities would be continuation of ungrazed conditions, which generally depend on the degree of recovery from any historic grazing impacts and the role fire has played in a given area. Species composition and ground cover within these ungrazed areas would continue to be affected by wildlife use, recreation and wildfire.

Effects on Vegetation Communities from Insects, Disease, and Noxious Weeds

A majority of forested stands are currently susceptible to insect and disease outbreaks because of the predominance of mature and older age-classes forest-wide as described in affected environment above. Each alternative described below takes a different approach to management of age-class diversity, which can ultimately affect future outbreaks.

Alternative 1 would have the greatest effects from insects and disease and subsequent failed fire suppression forest-wide because no management activities would be allowed that might curb their spread (Table VEG-6). Primary causal agents are the mountain pine beetle (lodgepole pine) and the spruce and Douglas-fir bark beetles. All of these insects are host-specific; that is, they only attack a particular species or group of species of tree. Insect epidemics occur under conditions of large contiguous acreages of large, old trees, a condition which is common on the forest. Without a change in stand structure, the likelihood of epidemic impacts from these beetles will continue to increase. Engelmann spruce stands and mixed conifer/lodgepole pine stands in the Bear River Range would tend to convert to subalpine fir stands as a result of spruce beetle and mountain pine beetle mortality that would remove or reduce the percentage of the host species, while not affecting the associated subalpine fir trees. Lodgepole pine stands in the Uinta Mountains tend to be primarily composed of pine, without the associated fir component. These stands would continue to experience mortality from mountain pine beetles, leading to increased fuels, and a subsequent increased likelihood of stand replacement fires, rather than converting to fir. Salvage of insect killed trees would not be permitted with this alternative, thereby preventing the removal of insect “pockets”. Removal of these infestation areas is a primary tool in preventing epidemic outbreaks. This alternative would rely on successful wildland fire use to improve age class diversity and to reduce susceptibility to insect and disease damage. It is expected, however, that insect epidemic probability would be higher in this alternative. Similarly, no salvage of dead trees would be permitted which would in turn increase fuel loadings and the probability of stand replacement fires.

Because roads act as conduits for the translocation of noxious weeds, this alternative would likely see fewer new populations. However, because only biological control methods would be used there would probably be a lower control of existing populations of noxious weeds.

Alternative 2 will protect more than twice the acres from insect and disease and subsequent failed fire suppression than Alternative 1. It would be similar to Alternatives 3, 6, and 7, but

provide less protection than Alternatives 4 or 5. Insects and disease would affect vegetation in the same manner as in Alternative 1; however, the effects would be reduced due to active management to restore ecosystems. A variety of treatments would be possible, including timber harvest, although harvest is limited to roaded areas. Within inventoried roadless, the primary tool to modify stand structure and associated insect susceptibility is the use of prescribed fire. Use of fire to modify stand structure will be limited by budget and other considerations such as its affect on recreation values. Therefore, use of prescribed fire may reduce susceptibility to a certain extent, but the majority of the inventoried roadless area would increase in insect susceptibility over time. Insect activity may increase within and adjacent to prescribed burning areas due to fire related stress on the surviving trees. Outside of inventoried roadless, harvest activity can be used to modify stand structure and thereby reduce the probability of insect epidemics. Emphasis would be placed on controlling insects and disease primarily in areas where older forested ecosystems are important as wildlife habitat and travel corridors.

Like Alternatives 1, 6 and 7, this alternative would have a low potential of creating new vectors for noxious weed invasions. Alternative 2 also takes a very active role (perhaps the highest) in the biological and chemical treatment of noxious weeds. Noxious weed control would be focused on preventing new weed invasions in order to maintain natural functions. Because roadless values will be maintained on most roadless area, this alternative would have a low potential for noxious weed spread along roads.

Insect and disease effects for Alternative 3 would be less than Alternative 2 because more acres are in MPCs that permit active management to modify stand structure and the roadless rule does not preclude entering inventoried roadless areas. This alternative would be intermediate to Alternatives 4 and 5 and Alternative 2 in effects from insects and disease. Conversion of spruce and mixed conifer stands would continue on MPC 3.2. The emphasis is management of wildlife and recreation and less on commodity outcomes. The miles of new roads allowed in this alternative, like Alternative 4, would have nearly the greatest potential of creating new vectors for noxious weed invasions (less than Alternative 5, but more than Alternatives 1, 2, 6, and 7. Like Alternative 2, noxious weed control would focus on preventing new weed invasions in order to maintain natural functions.

Alternative 4 takes high action against the spread of insects and disease (less than Alternative 5, but more than other alternatives). Conversion of spruce to subalpine fir would continue in the Bear River Range, but to a lesser extent than Alternatives 1, 2 and 3 due to the increase of acreage in the 5.1 and 5.2 MPCs. This alternative does not take a vigorous approach to the control of noxious weeds, however, and the continued advancement of weed populations is expected. The miles of new roads allowed in this alternative, like Alternative 3, would have nearly the greatest potential of creating new vectors for noxious weed invasions (less than Alternative 5, but more than Alternatives 1, 2, 6, and 7).

Alternative 5 would take the greatest action against the spread of insects, disease, and noxious weeds forest-wide using both biological and chemical agents. A greater focus would be placed on tentatively suited timber stands and those adjacent that might facilitate the spread of insects and disease. The roadless rule does not apply to this alternative, and treatments could be applied to all areas except high value recreation and wilderness areas. Treatments would concentrate on

spruce-fir stands in the Bear River Range and lodgepole pine stands in the Uinta Mountains, which are the highest risk types in their respective ranges. The miles of new roads allowed in this alternative would have the greatest potential of creating new vectors for noxious weed invasions than all other alternatives.

Alternatives 6 and 7 would take a moderate degree of action against the spread of insects, disease, and noxious weeds forest-wide using mechanical treatments (primarily to treat insects and disease) as well as biological and chemical agents (primarily to treat noxious weeds). Emphasis would be placed on controlling insects and disease primarily on MPC 5.2 lands and in other management prescription categories where older forested ecosystems are important as wildlife habitat and travel corridors. Effects on inventoried roadless areas would be the same as Alternatives 1 and 2. Noxious weed control would be focused on preventing new weed invasions in order to maintain natural functions. The miles of new roads allowed in these alternatives would have a relatively low potential of creating new vectors for noxious weed invasions (less than Alternatives 3, 4 and 5).

Effects on Vegetation Communities from Wildlife Management

Wildlife Management to improve habitat will have an overall positive effect on vegetation communities. Management of wildlife habitat focuses on improving age-class diversity and corresponding structural diversity. Habitat management generally uses fire management and timber harvest tools, which are described in those sections in detail.

Effects on Vegetation Communities from Aquatic and Semi-aquatic Species Management

The effects on vegetation from aquatic and semi-aquatic resources is primarily associated with livestock management in and around riparian and wetland communities. Alternatives 4 and 5 do not focus on aquatic and semi-aquatic species management, while Alternatives 1, 2, 3, 6, and 7 do so by removing riparian acres not meeting forest plan objectives from the suitable rangelands. In addition, Alternative 2 also removes over 26,000 acres of uplands in portions of 6th order watersheds that have known populations of Colorado River or Bonneville cutthroat trout within allotments and that have at least 20 acres of these riparian areas that are not meeting forest plan objectives. As a result, Alternative 2 would improve these watershed and riparian conditions the most rapidly. Alternatives 1, 3, 6, and 7 only remove those riparian areas not meeting forest plant objectives from the suitable range, which would result in a very minor effect (0.1 percent reduction of total capable rangelands resulting 0.1 percent in livestock numbers).

Effects on Vegetation Communities from Oil and Gas Activities

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" as described in Topic 9. It is estimated to be about 68,300 acres.

Vegetation productivity could be lost as a result of from oil and gas exploration and development from well pad placement, road construction and ancillary facilities. Effects to riparian areas are discussed in Topic 1 – Soil and Water Resources. For a successful well, a site of about 40% of the original drill site would remain disturbed for the life of the well (USDA Forest Service, 1997b). However unsuccessful drill sites can be reclaimed. Reclamation generally includes spreading topsoil and reseeding with native species. If disturbed sites are prepared and seeded with native species properly, reclamation would further reduce impacts.

Surface disturbance associated with leasing, such as drilling and road construction can cause weeds to spread. As discussed earlier, roads can serve as conduits for the transport of certain weed species. Seeds clinging to drilling equipment and vehicles used in infested areas could be carried to previously uninfested areas during construction activities. Standards and guidelines should minimize these types of impacts. Any operation would be responsible for implementing a plan to control and eradicate noxious weeds to reduce the risks of surface disturbance.
Oil and gas activities also have the potential to disturb habitat of threatened, endangered and sensitive plant species. There are no known occurrences of plant species classified as threatened or endangered in this area of the Forest. There is one sensitive plant species, Uinta Greenthread, known to occur outside the Appeal Settlement Zone on the Mountain View Ranger District.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alt 4) the Table Top Unit, an area of existing leases, could be explored and result in effects to wildlife habitat. The degree to which exploration is predicted within the Table Top Unit is affected by whether or not new leases could be issued and under what stipulations.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could remove vegetation on an estimated 20 acres because of oil and gas exploration activities. In areas outside of the Table Top Unit that are not currently leased there would be no effects to vegetation.

Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could remove vegetation on about 20 acres. Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining available acres, new leases could be issued but surface occupancy would not be allowed.

Alternative 3 precludes leasing availability in areas recommended for wilderness in the future and does not allow new leases with surface occupancy in areas managed for undeveloped (Prescription 2.6) and backcountry recreation (Prescription 4.1 and 4.2) values and terrestrial habitat (Prescription 3.2). Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,500 acres are available under Standard Lease Terms. Oil and gas activities are estimated to disturb about 75 acres. Some of this development is predicted on existing leases within the Table Top Unit. The degree

of effects depends on the leasing terms applied. Vegetation productivity could be affected for 20-30 years because of field development. Some of this development is predicted within the Table Top Unit. A Controlled Surface Use Stipulation would be attached to all leases requiring surveys to determine the possible presence of any sensitive plant species. Operations would be designed or located so as to not adversely affect the viability of populations. Lease Notices would be attached where threatened or endangered plant species are potentially located. This would ensure the protection of these species through the Endangered Species Act.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to vegetation are probable.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to affect vegetation productivity on about 105 acres. Some of the effects could last 20-30 years because of field development. Other mitigation measures that could be required as conditions of approval could include moving the site up to 200 meters (656 feet) if the site could be better located.

In Alternative 6, leasing availability is precluded in areas recommended for wilderness in the future and new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized recreation values and terrestrial habitat. Oil and gas activities are estimated to disturb about 75 acres. Some of this development is predicted on existing leases within the Table Top Unit. Vegetation productivity could be affected for 20-30 years should a field be discovered. In the remainder of the area the effects to vegetation would be minimal because of no surface occupancy.

Alternative 7 would preclude leasing on 20,400 acres recommended for wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb about 85 acres. Vegetation would be removed for road construction and well pads. Vegetation productivity could be affected 20-30 years should a field be discovered. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered.

The likelihood of encountering a plant species at risk through oil and gas activities is increased because there are more acres available for surface occupancy in Alternative 7. Because a Controlled Surface Use Stipulation would require surveys to determine the possible presence of any sensitive plant species, operations would be designed or located so as to not adversely affect the viability of the populations. Lease Notices would be attached where threatened or endangered plant species are potentially located. This would ensure the protection of these species through the Endangered Species Act.

Further impacts to the vegetation could occur as a result of the development of private minerals. Oil and gas activities on lands with private minerals are not required to meet Forest Plan standards.

Effects on Vegetation Communities from Roadless Area Management

Roadless area management would have varying degrees of both positive and negative effects. Roadless areas, by definition, are not necessarily non-motorize. Motorized trails are allowed within roadless area and it is the management of areas as non-motorized that reduces the potential for negative effects from recreation activities (especially unauthorized OHV use), noxious weed spread, and from unwanted human-caused fire ignitions, which typically occur along roadways. It is the lack of roads, however, that reduces the ability to manage these landscapes for Properly Functioning Conditions using mechanical and timber harvest tools, and may reduce the ability to manage prescribed fire depending on the need to access the areas to be burned.

Alternative 1 manages over 550,000 acres as non-motorized, which is more than any other alternative. This alternative maintains roadless area values on all the roadless acres (over 600,000 acres). Alternative 1 prohibits road construction, reconstruction, and timber harvest in any roadless area. Without additional roads, access for management would be the most limited of the alternatives. Wildland fire use and failed fires suppression would be greatest under this alternative because of the increased age of existing vegetation, and subsequent increase in fuels because of no prescribed fires or other mechanical vegetation treatments including timber harvest would be allowed. It would have the lowest potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Alternative 2 is second only to Alternative one, in the acres managed as non-motorized (436,000 acres). This alternative maintains or mostly maintains roadless area values on approximately 97 percent (over 585,000 acres) of the existing roadless areas. This alternative does not allow road construction and reconstruction in inventoried roadless areas but does allow some vegetation to be managed to improve habitat for rare species, or to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. It would be similar to Alternative 1 in its low potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Alternative 3 manages over 390,000 acres as non-motorized and maintains or mostly maintains roadless area values on approximately 70 percent of the existing roadless areas (425,000 acres). In this alternative, roadless area management would have a moderately high effect on vegetation communities because nearly 40 miles of new road would be constructed to manage vegetation through timber harvest. Most roadless areas in this alternative would generally only be developed where it would be necessary for achieving habitat improvement or restoration. Because of road construction, however, this alternative would have a high potential for negative effects from recreation activities in existing roadless areas, including unauthorized OHV use. It would have an intermediate potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Alternative 4 manages nearly 242,000 acres as non-motorized and mostly maintains roadless area values on approximately 22 percent (132,000 acres) of existing roadless areas. Inventoried roadless areas in this alternative generally allow development for commodity outputs and

recreation access. This alternative has the greatest ability to manage vegetation for PFC, but also has a very high potential for negative effects on vegetation from recreation activities, including unauthorized OHV use. It would have the highest potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Alternative 5 manages approximately 308,000 acres as non-motorized and maintains or mostly maintains roadless area values on approximately 19 percent (117,000 acres) of the existing roadless areas. In Alternative 5, most inventoried roadless areas are managed to provide access for timber and grazing management, oil and gas exploration and development, and recreation with project-by-project attention to critical habitats for wildlife, fish, and plant population viability. This alternative produces the greatest amount of commercial timber harvest (12,400 acres), which would require the greatest about of road construction in existing roadless areas. Like Alternative 4, this alternative has a great ability to manage vegetation for PFC but as noted in **Effects on Vegetation Communities from Recreation Management,** has the highest potential for negative effects on vegetation from recreation activities in existing roadless areas, including unauthorized OHV use. It would be similar to Alternative 4 in its high potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.
Alternative 6 manages about 412,000 acres as non-motorized and maintains or mostly maintains roadless area values on about 96 percent (over 580,000 acres) of the existing roadless areas. Like Alternative 1, Alternative 6 adjusts allowed activities to be consistent with the National Roadless Area Conservation Rule. Only 6 miles of new road are allowed for timber harvest, which focuses on cutting and removal of generally small diameter trees to maintain or improve roadless characteristics or habitat for rare species, or to maintain or restore ecosystem composition and structure, and/or reducing the risk of uncharacteristic wildfire effects. It would be similar to Alternative 2 in its low potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Alternative 7 manages nearly 416,000 acres as non-motorized and maintains or mostly maintains roadless area values on approximately 75 percent (456,000 acres) of the existing roadless areas. This alternative identifies individual roadless area values and resource capabilities and conditions. Road construction and reconstruction are not allowed in some areas, nor is cutting, sale, and removal of timber. Timber harvest and road construction (approximately 7 miles) are allowed in portions of some roadless areas for purposes of improving habitat for threatened, endangered, proposed, or sensitive species, or to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. Like Alternative 6, it would be similar to Alternative 2 in its low potential for unauthorized OHV use, spread of noxious weeds, and unwanted human-caused fires.

Effects from non-motorized ROS are also discussed in more detail in **Effects on Vegetation Communities from Recreation Management**.

Effects on Vegetation Communities from Special Designation

Special designations, research natural areas (RNA), special interest areas (SIA), and special areas (SA) would be beneficial to vegetation communities because they would minimize the likelihood for undesirable impacts from management or recreational activities. RNA status would be the

most restrictive on allowed activities and would focus on maintaining reference conditions for various cover types on the Forest. SIA and SA status would manage for the vegetation values, but would allow more management activities consistent with the purposes for which these areas are established.

Alternative 2 provides the most protection by designating approximately 6,900 acres of RNAs and about 32,500 acres of SIAs and SAs (this is the only alternative that establishes a Tri-Canyons Special Area in the Cottonwood Canyons area). The SIAs and SAs in this alternative are, for the most part, directed at maintaining values of rare communities (such as Tall Forb Communities), reference vegetation communities (e.g. Douglas-fir/Ninebark habitat type), and rare plant species. Alternative 7 provides nearly as much protection as Alternative 2. This alternative, while omitting the Tri-Canyons Special Area, increases the Logan Canyon SIA by adding approximately 8,800 acres in the lower portion of the canyon to include the south-facing slopes with several Species At Risk and bigtooth maple and juniper communities. Alternatives 1 and 6 are intermediate in the protection they provide, primarily because they do not include Tri-Canyons Special Area. They also focus on maintaining many of the values identified in Alternative 2. Alternatives 3, 4, and 5 each provide approximately 6,900 acres of protection through RNA and/or SIA designation.

Effects on Vegetation Communities from Heritage Resource Management

Heritage Resource Management will have little effect on vegetation communities, except to avoid impacts where these resources occur in areas of potential vegetation management. The greatest potential for effects through avoidance would be in Alternative 2 where over 186,000 acres are treated, primarily through prescribed fire. The lowest potential for effects would be in Alternative 1 where no acres are treated.

Cumulative Effects

Vegetation communities on nearby or intermingled private lands have been experiencing changes in recent years through land development that will likely continue in the future. Some intermingled private lands in the Uinta Mountains have been harvested to a greater degree than adjacent National Forest lands. Approximately 8 Sections (over 5,000 acres) have been, or will be harvested on the North Slope, and on an additional 5 sections (over 3,000 acres) were harvested in the past with some clean-up harvesting (removal of the remaining merchantable timber) being done. Some harvest may occur within approximately 5,000 acres of private land just north of the Forest boundary and west of the Bear River to reduce fire hazard near homes and to produce some wood fiber. Because of the scenic values managed for on these lands, however, large-scale harvests are not expected. Nearly all of the lands adjacent to the Wasatch Mountains (Bear River and Wasatch Ranges) are developed. This has resulted in the loss of many thousands of acres of the sagebrush and other rangeland types in these lower elevation areas. In addition, some private ranch lands at lower elevations adjacent to the Forest have been converted from rangelands and pasturelands to rural home sites.

There has been an increase in noxious weeds on private lands contributing to increased infestation on the Forest and a continuing increased threat in the future. This has occurred

especially in the Wasatch Mountains, but is also occurring in the Uinta Mountains and the Stansbury Mountains as well.

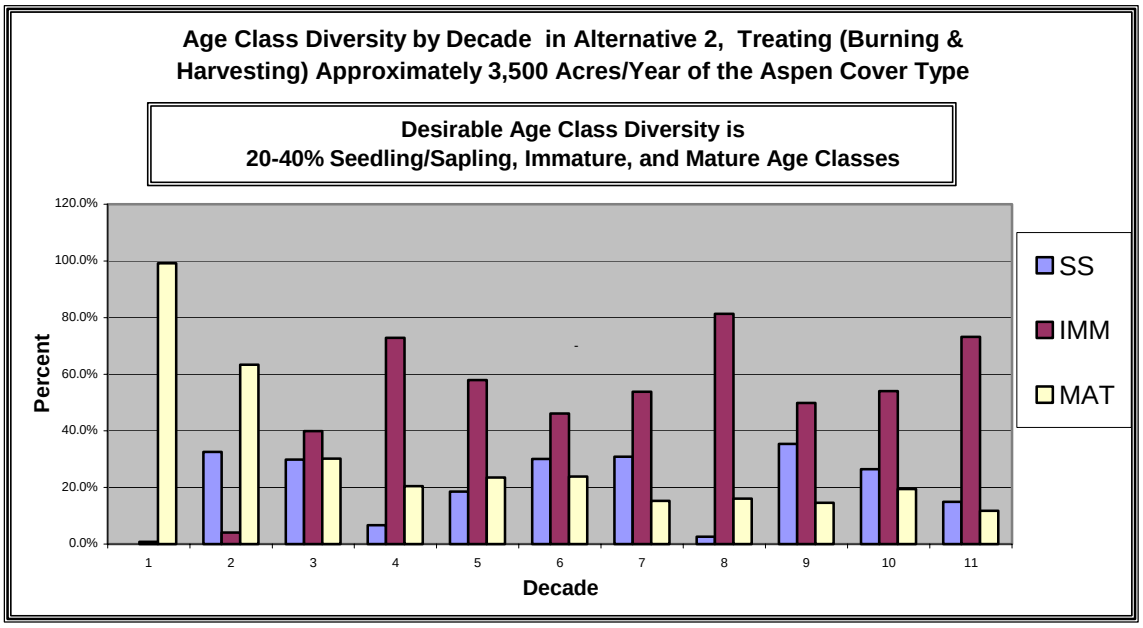
It is the combination of all vegetation treatments (harvest, fire, and mechanical treatment), access (roads and roadless area management), livestock grazing, and recreation impacts that ultimately result in the rate at which the alternatives move the vegetation composition, structure (age classes and patterns) and functions toward PFC. Because Alternative 2 provides the most active management and Alternative 1 the least, all others are compared to those two. Figure VEG-3 illustrates how long it takes, with harvest and prescribed fire under Alternative 2, for the Aspen vegetation type to reach PFC on the Wasatch-Cache National Forest portion of the **Overthrust Mountains ecological section**. Figure VEG-4 shows that PFC will not be reached in the Conifer vegetation types within the next 100 years in the **Uinta Mountains** ecological section, even through the most active management. It will likely involve unplanned ignitions (fires) in order for PFC to be reached. Figure VEG-5 shows that the Oak Cover Type will reach PFC within the second decade (20 years) in the Overthrust Mountains ecological section. Figure VEG-6 shows that the Sagebrush Cover Type approaches PFC in decade 4 and will reach PFC by decade 7 (70 years) across the Forest, then maintains PFC for the next 3 decades. Unlike the outcome for sagebrush in Figure VEG-6, the outcomes for aspen, conifer, and oak shown in Figures VEG-3, VEG-4 and VEG-5 illustrate that with continued treatments as originally proposed (e.g. 3,200 acres per year for aspen and aspen-conifer), the vegetation types may reach PFC within the first few decades, but they go away from PFC within a decade or two after those conditions are reached. Under any alternative, management (number of acres treated) would be adjusted to maintain PFC once it is reached.

Cumulatively, Alternative 1 would have the least predictable effect on returning vegetation cover types to PFC because no acres would be treated mechanically or through harvest or prescribed fire, relying on wildland fire to bring ecosystems back to PFC. Alternative 1 would have the least impacts from development. No roads would be constructed or reconstructed and no new recreation facilities would be allowed. As a result, this alternative would likely have the least negative effect on vegetation communities from recreation and unauthorized uses, because no new roads would be constructed. In addition, 2 miles of roads and 76 miles of motorized trails would be closed in recommended wilderness. Alternative 1 would have the lowest potential for noxious weed expansion because roads are one of the greatest vectors for their spread. This alternative would likely have the greatest effects from insects and disease in forest-dominated vegetation communities, which could result in the greatest amount of acres burned through failed fire suppression in the next 100 years. These fires would likely be more severe in nature than any other alternative as well as being uncharacteristically large, which could threaten adjacent private lands. No vegetation cover types are predicted to reach PFC forest wide in the next 100 years.

Cumulatively, Alternative 2 would have the greatest effect on returning vegetation cover types to PFC. This alternative returns all cover types to PFC, except Douglas-fir communities in the Overthrust Mountains and Uinta Mountains Ecological Sections to PFC in 10 decades or less (2-3 decades for sagebrush, oak, and aspen communities). About 19,000 acres would be treated annually primarily through prescribed burning, but also through mechanical treatment of non-timber vegetation and through timber harvest of forested communities. Approximately 6 miles of new roads would be constructed for timber harvest and 3 miles of roads for oil and gas

exploration. About 7 miles of trails would be closed to motorized use in recommended wilderness areas. Some new recreation facilities would be allowed. Alternative 2 would have a low effect from insects and disease especially in forest-dominated vegetation communities where wildlife habitat/corridors are critical. Insect and fire effects on adjacent private lands would be less than Alternative 1.

Figure VEG-3. Age class diversity of the Aspen and Aspen/Conifer vegetation cover types under Alternative 2 (most active management alternative) on the Overthrust Mountains Ecological Section of the Wasatch-Cache National Forest over the next 10 decades. Decade 1 is the current conditions.



Cumulatively, Alternative 3 would have an intermediate effect on returning vegetation cover types to PFC. About 9,000 acres would be treated annually through prescribed burning, mechanical treatment of non-timber vegetation and through prescribed burning and timber harvest of forested communities. In the Overthrust Mountains Ecological Section, oak and aspen cover types reach PFC within 5 decades and in the Uinta Mountains Ecological Section mixed conifer reaches PFC within 5 decades and aspen within 9 decades. Alternative 3 would have an intermediate effect in vegetation communities from various forms of development. This alternative would allow approximately 10 miles of roads constructed for oil and gas development or exploration. Approximately 39 miles of new timber harvest roads would be constructed and some new recreation facilities would be allowed. Similar to Alternative 2, this alternative would have a low effect from insects and disease especially in forest-dominated vegetation communities where wildlife habitat/corridors are critical. Insect and fire effects on adjacent private lands would be greater than Alternative 2, but less than Alternative 1.

Figure VEG-4. Age class diversity of all Conifer vegetation cover types under Alternative 2 (most active management alternative) on the Uinta Mountains Ecological Section of the Wasatch-Cache National Forest over the next 10 decades. Decade 1 is the current conditions.

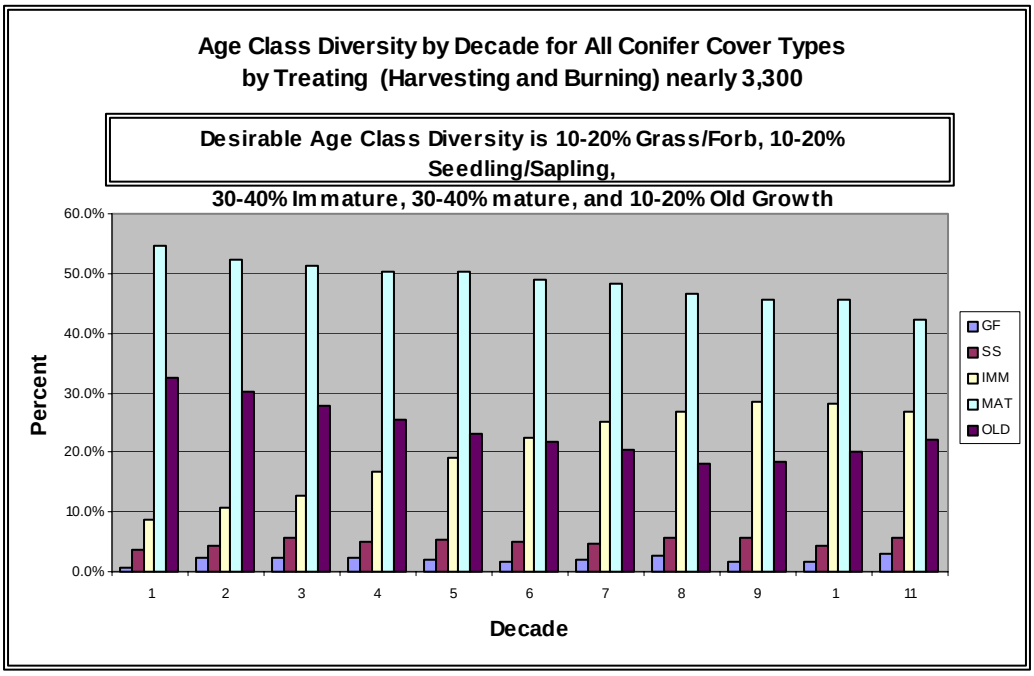


Figure VEG-5. Age class diversity of the Oak vegetation cover type *under Alternative 2 (most active management alternative)* on the Overthrust Mountains Ecological Section of the Wasatch-Cache National Forest over the next 10 decades. Decade 1 is the current conditions

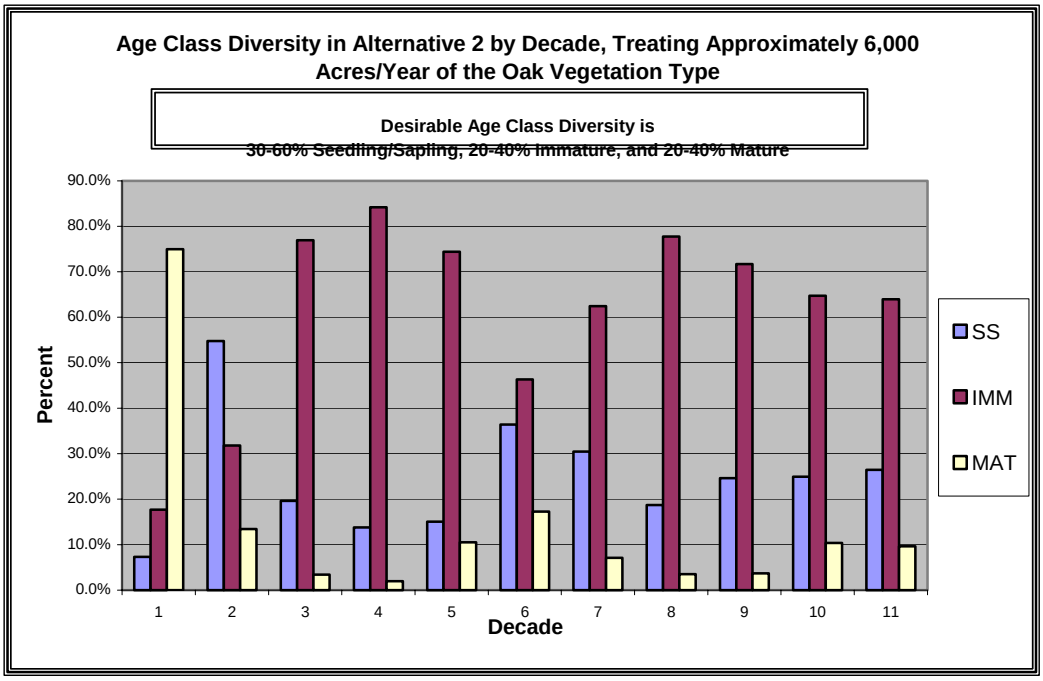
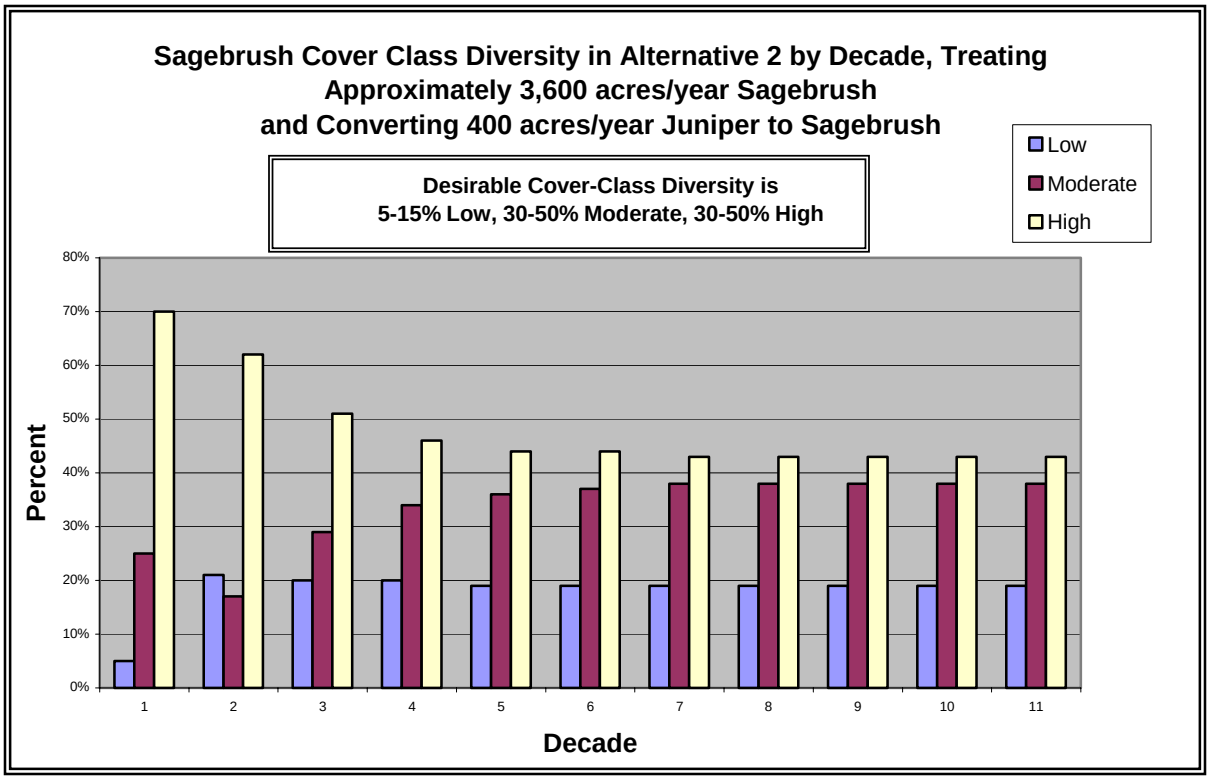


Figure VEG-6. Age class diversity of the Sagebrush vegetation cover types under Alternative 2 (most active management alternative) over the entire Wasatch-Cache National Forest over the next 10 decades. Decade 1 is the current conditions.



Cumulatively, Alternative 4 would the lowest effect, when compared to all alternatives, on returning vegetation cover types to PFC. With the exception of Alternative 1, Alternative 4 treats the fewest acres (nearly 3,800) annually through prescribed burning and timber harvest. No mechanical treatment of the oak vegetation type would occur. This alternative would allow the construction of 49 miles of new timber harvest roads, which could result in increased recreation access as well as additional miles that could serve as a conduit for noxious weeds introductions. Alternative 4 would have an intermediate effect on vegetation communities from various forms of development. This alternative would continue the suspension of oil and gas leasing/ development. New recreation facilities would be allowed. This alternative would continue to have a moderate effect from insects and disease because less is being done to manage and maintain these effects.

Cumulatively, Alternative 5 would have a low effect on returning vegetation cover types to PFC. Nearly 6,100 acres would be treated annually, through prescribed burning, mechanical treatment of non-timber vegetation and through prescribed burning and timber harvest of forested communities. Alternative 5 would have the greatest effect in vegetation communities from various forms of development. This alternative would allow 70 acres of disturbance for oil and gas leasing/development. Approximately 49 miles of new timber harvest roads would be constructed and new recreation facilities would be allowed. Similar to Alternative 2, this alternative would have the lowest effect from insects and disease in forest-dominated vegetation communities, because management emphasis on commercial timber harvest would permit

prevention and suppression treatments, and would tend to minimize the effects of insects and fire on adjacent private lands.

Alternative 6, Like Alternative 3, would cumulatively have an intermediate effect on returning vegetation cover types to PFC. Approximately 9,100 acres would be treated annually, through prescribed burning, mechanical treatment of non-timber vegetation and through prescribed burning and timber harvest of forested communities. Alternative 6 would also have an intermediate effect (lower than Alternative 3) on vegetation communities from various forms of development. This alternative would also allow 50 acres of disturbance for oil and gas leasing/development. Slightly more than 6 miles of new timber harvest roads would be constructed. Some new recreation facilities would be allowed. Similar to Alternatives 2 and 3, this alternative would have a relatively low effect from insects and disease especially in forest-dominated vegetation communities where wildlife habitat/corridors are critical, and affects on adjacent private lands.

Alternative 7, like Alternatives 3 and 6, would cumulatively have an intermediate effect on returning vegetation cover types to PFC. Approximately 8,700 acres would be treated annually, through prescribed burning, mechanical treatment of non-timber vegetation and through prescribed burning and timber harvest of forested communities. Alternative 7 would also have an intermediate effect (lower than Alternative 3) on vegetation communities from various forms of development. This alternative would also allow 50 acres of disturbance for oil and gas leasing/development. Like Alternative 6, slightly more than 6 miles of new timber harvest roads would be constructed. Some new recreation facilities would be allowed. Similar to Alternatives 2, 3, and 6 this alternative would have a relatively low effect from insects and disease especially in forest-dominated vegetation communities where wildlife habitat/corridors are critical, and affects on adjacent private lands.

Topic 2 – Biodiversity and Viability

Botanical Resources

Threatened, Endangered, Proposed, Sensitive Plant Species and Plant Species at Risk

Introduction

Botanical resources include the abundance and distribution of different vascular and non-vascular native plant species. This section presents a more detailed analysis of the most rare elements of the flora—Threatened, Endangered, and Sensitive (TES) plant species. Additionally, we include some discussion of watch list species, species at risk, rare and unique communities, and plant species of cultural and social importance.

The state of Utah has a remarkable diversity of native flora and is known for its large number of endemic and rare plant species. Indeed, only four other states (California, Florida, Texas, and Oregon) equal or exceed Utah in the total numbers of rare plant species (Shultz 1993; UDWR 1998a). The flora diversity of Utah is comprised of 2602 species and 393 infraspecific taxa (subspecies or varieties) (Welsh et al. 1993) of vascular plant species that are considered to be native. Many of these rare species, 247 taxa (157 species and 90 infraspecific taxa), are narrow endemics with their entire global distribution within the state of Utah (UDWR 1998b). Several of these species have their entire global distribution within the boundaries of the Wasatch-Cache National Forest (Cronquist et al. 1972; UDWR 1998b).

The richness of native plant species and unique flora of Utah and the Wasatch-Cache National Forest can best be explained by the wide diversity of habitats and wide range of geomorphology (UDWR 1998b). Habitats within the state of Utah and within the Wasatch-Cache National Forest range from semi-arid shrublands, to high mountain ranges that support coniferous forests, subalpine forests and grasslands, and true alpine communities (Cronquist et al. 1972). Many rare and endemic species are tied to unique soil types. The geomorphology of Middle Rocky Mountain Province and much of the Wasatch-Cache National Forest is comprised of the very dissimilar Uinta Mountains and Wasatch Range and the Bear River Range. The Uinta Range trends east-west and is practically devoid of igneous rock while the Wasatch Range trends north-south and is comprised of unusual assembly of igneous, sedimentary, and metamorphic rock (Stokes 1988). The Bear River Range of the Wasatch-Cache National Forest contains habitat for six rare endemic plant species, including one Threatened species. Some of these species are endemic to Logan Canyon and its tributaries while others are limited in distribution to portions of the range in northern Utah and southeastern Idaho (Glisson 1995a). These species are all closely associated with the dolomite and limestone geologic formations.

Laws, Policy, and Direction

Plant species that are federally listed as Threatened or Endangered, or that are proposed for listing, are protected under the Endangered Species Act (ESA, 1973) and Forest Service regulations (FSH 2609.25 and FSM 2670), as are candidate species and species of concern (those species with sufficient biological information and existing threats to warrant listing by the Fish and Wildlife Service). The National Forest Management Act (1976) and USDA Forest Service Policy require that Forest Service Lands be managed to maintain viable populations of all native plant and animal species. A viable population is defined as a population that has a large enough distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range.

Sensitive species are similarly protected under the Regional Forester's Sensitive Species Program. For sensitive species, management efforts to maintain their population viability and preservation are already in place. The Forest Service management policy (FSH 2609.25, 1.25, 1988 and FSM 2670) ensures that for all TEPS plant species, the following measures will be taken: (1) biological evaluations will be written for all activities that may impact sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered, or proposed species, and (3) sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. This Forest Service management policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved

Additionally, special management direction can be designed and implemented for Threatened, Endangered, Proposed, and Candidate species (TEPS) to ensure their protection and recovery under all Forest Service management activities. Conservation Assessments, Strategies, and Agreements, and Recovery plans outline the current status of such species and detail management needs to promote conservation and recovery of all TES plants and plant species at risk. Many species currently found on the Wasatch-Cache National Forest have signed Conservation Strategies/Agreements and Recovery Plans (Threatened species) in place. All existing strategies and plans along with future plans for these plant species will be met and upheld to provide for viability, conservation, and recovery of these species.

Affected Environment

The affected areas for direct and indirect effects on TES plants and plant species at risk are the lands administered by the Wasatch-Cache National Forest. Management Areas will be highlighted in discussions, due to the significance of their contributions to Forest-wide populations. Several species have their entire distribution within the Wasatch-Cache Forest Boundaries and other plants are at the fringe of their natural range. The affected areas for cumulative effects on TEPS plants include national forest and other ownership lands within the Wasatch, Uinta, Bear River, and Stansbury Mountains and also consider the natural ranges of distribution for individual plant species.

Plant Types Within the Wasatch-Cache National Forest

Vascular Plants

Vascular plants comprise the largest and most dominant organisms within each major vegetation type. Included in this group are seed-bearing plants such as angiosperms (flowering plants) and gymnosperms (conifers), and spore-bearing plants such as ferns and fern allies. Vascular plants are primary producers, which utilize photosynthesis to generate carbohydrates. Animals and fungi in turn consume these carbohydrates. Additionally, vascular plants form the forest structure that provides substrate and habitat for other organisms, influence microclimates, and produce litter and decomposing wood, which contributes to organic matter and soil development. Many vascular plants exist in symbiotic relationships with fungi and other plants, thus enabling some species to be non-photosynthetic and providing the capability to fix nitrogen. In addition to their role in ecosystem functions, vascular plants provide many commercially important resources that include timber, paper, rope, medicines, foods, and ornamentals.

Non-vascular Plants

Bryophytes - Bryophytes (mosses, liverworts, and hornworts) are small, green non-vascular plants that reproduce by means of spores instead of seeds. Although small, they play an important role in water and nutrient cycles, and provide seed beds for many plants (Steele and Geier-Hayes 1995). Many play crucial roles in the hydrology of meadows and riparian areas. Bryophytes can be found in all types of environments with the exception of salt water. Throughout the Wasatch-Cache National Forest, bryophytes can be found on rock outcrops, in hanging gardens, and in wet meadows, bogs, and fens.

The worldwide bryoflora is comprised of approximately 15,000 to 18,000 (Merrill 1995) species of bryophytes. In North America, 1,320 species of moss (Anderson et al. 1990), and 525 species of liverworts and hornworts (Stotler and Crandall-Stotler 1977) have been documented. Currently, no comprehensive moss flora exists for Utah. In a recent study of bryophytes in the Columbia River Basin south of the Canadian border, Christy and Harpel (1997) noted 50 taxa endemic to western North America. Their study found that about half the total bryoflora had fewer than five known populations. This lack of distribution knowledge hindered the development of rarity rankings and pointed to the need for systematic collecting and taxonomic studies in the Western United States.

Bryophyte species usually are more widely distributed than vascular plant species. However, within a broad overall range, they may occur in very localized patterns in ecologically specific habitats. Several species of mosses including *Polytrichum juniperinum, Bryum* spp. *Grimmia* spp. and *Drepanocladus aduncus* are found widespread throughout the Wasatch-Cache National Forest (Kelly 2000). Other species have very limited distribution on the WCNF (i.e. *Grimmia alpicola* var. *latifolia* - found only on submerged granitic rock in Bells Canyon, *Metaneckera menziesii* - only known in City Creek Canyon on shaded limestone cliffs, and *Scouleria aquatica* - only known above Brighton). The distribution of liverworts throughout the Wasatch-Cache National Forest is less known because little floristic work for such species has been completed

within this geographic area. It is known however, that one liverwort species, *Ricciocarpus natans,* is common in Logan Canyon but infrequent elsewhere in the western US (Flowers 1945).

Lichens - Lichens are a unique combination of two different types of organisms, fungus and alga, growing together in a symbiotic relationship. Lichens are often sensitive indicators of air pollution. They play important roles in the cycling of water and nutrients and in relationships with many other plants and animals. Lichens also play an important role in soil formation due to their ability to fix nitrogen by changing atmospheric nitrogen into a chemical form that plants can use. A total of 18,000 to 20,000 lichen species have been documented worldwide with about 3,330 species documented for the United States and Canada. Lichens grow on rock, soil, trees, fallen logs and other surfaces.

A list of Lichens of Utah (Newberry 1991a) and Lichens of the High Uinta Wilderness (Newberry 1994) provide detailed information of species and distribution of lichens within these wide-ranging areas. Several species were reported for the first time in Utah including *Ascarospora nitida, Lecanora bicincta,* and *Solorina bispora.* All of these were identified for the first time from collections made on the Wasatch-Cache National Forest. Despite these floristic studies, a lack of baseline inventories documenting comprehensive lichen species presence, abundance, and geographic distributions point to the need for additional studies. Management of both lichens and bryophytes would benefit from further ecological studies and distribution data. Limited information currently on rare lichens and their distributions prevent the development of species-specific management. As such, these species were not analyzed in the effects analysis for the Wasatch-Cache Forest plan revision.

Fungi/Cryptogamic Crusts

Fungi - Fungi are members of the plant kingdom that contain no chlorophyll and rely on organic material for nutrition and play an important role in decomposition and nutrient exchange. Some fungal species, such as the truffles, boletuses, chanterelles, and morels are important for recreational and commercial gatherers. Many fungi form symbiotic relationships, called mycorrhizal associations, with vascular plant roots underground, thus improving the ability of these vascular plants to exploit soil reserves for moisture and nutrients. Lack of knowledge on the role of fungal species in the ecosystem and difficulty of identification prevents the development of species-specific management. As such, these species were not analyzed in the effects analysis for the flora of Wasatch-Cache National Forest.

Cryptogamic Crusts – Cryptogamic crusts (also described as microbiotic, cryptobiotic, and microphytic crusts) are another very important ecosystem component. This biological soil crust is an association of algae, mosses, lichens, liverworts, cyanobacteria, and fungi. Cryptogamic crusts play a vital role in soil stabilization, nutrient cycling, soil moisture, and vascular plant interactions (St. Clair et al 1984; Eldridge 1993; Ladyman and Muldavin, 1996). They also play an important role in discouraging the dominance of annual weed growth (Belnap et al. 2001). These crusts are generally believed to protect the soil against erosion, and affect infiltration in semiarid and arid ecosystems (Eldridge 1993; Ladyman and Muldavin 1996). Crusts are integral components of rangeland systems, and their presence is often indicative of the condition and trend of these systems (Belnap 1992).

Cryptogamic crusts are often associated with potential vegetation types that include low sagebrush (includes mesic, mesic with juniper, and xeric), salt desert shrub, big sagebrush-warm and cool, and juniper (St. Clair et al 1984; USDA Forest Service and USDI Bureau of Land Management 1997). More than 20 percent of the Wasatch-Cache National Forest is comprised of these vegetation types. Anderson et al. (1982a) described the soil conditions one would expect these cryptogamic crusts to occur. The authors found that the amount of silt is positively correlated with these crusts, while surface rock and sand are higher on areas with less-developed crust. Kaltenecker and Wicklow-Howard (1994) found a negative relationship between cryptogamic crusts and herbaceous undergrowth in sagebrush communities. They found that cryptogamic crusts were less abundant in sagebrush communities that had high herbaceous cover.

In the Stansbury Mountains, sagebrush and juniper (some pinyon-juniper) communities that have invaded the sagebrush, have the greatest potential for abundant cryptogamic soil crusts because of their soils and herbaceous vegetation cover. Elsewhere on the forest, soils are either coarse or, where soils have a greater amount of fine soil materials, typically have a high amount of herbaceous undergrowth. We estimate that the Stansbury Mountains have approximately 33,000 acres of sagebrush and juniper communities. While some of these communities occur on sites that are either too coarse or have too great vegetation cover to support cryptogamic crusts, there are a large amount of acres that have the potential to support well-developed crusts.

Sagebrush communities occur in nearly all elevation zones throughout the forest and juniper communities, while most expansive on the Stansbury Mountains, occur throughout the Overthrust Mountains Ecological Section as well. Belnap (2002) stated that, while these crusts may be more abundant on the Stansbury Mountains, occur throughout the Forest. She noted that some form of crust cover would occur wherever light can reach the soil surface. Therefore, absolute cover of biological soil crusts is lower where vegetation cover is higher, but they remain an important component for soils in plant interspaces, even when those interspaces are small. Belnap went on to note that lichen and moss cover (two common components of biological soil crusts) will be higher on silty soils, but sandy soils have higher cover of cyanobacteria. She commented that cryptogamic crusts likely play a more important ecological role in the portion of the Stansbury Mountains where vascular plant cover is lower (pinyon-juniper, juniper, and sagebrush communities), but are also an important component throughout the forests, both from a soil protection/soil chemistry perspective and from a biodiversity viewpoint as well.

Kaltenecker and Wicklow-Howard (1994) noted that use by domestic livestock and off road vehicles (ORVs) result in the disturbance and compaction of surface soils and have a negative effect on these crusts. In addition to their greater potential for eriosion, these crusts, which play an important role in contributing nitrogen to arid and semi-arid ecosystems. These authors also noted that fire could destroy cryptogamic crusts. The recovery rate from any of these disturbances was dependent on the severity of disturbance. Johansen and others (1984), as referenced in Kaltenecker and Wicklow-Howard (1994) noted that these crusts could recover fully within five years of fire if no other disturbances occurred. Anderson and others (1982b) described a rapid recovery rate in 14 – 18 years following protection from grazing. During the next 20 years, the rate of recovery showed only slight increases in cryptogamic and algal cover.

The rate of recovery following ORV use was not described by any of these authors, but would likely be at least as slow as that described for livestock impacts.

Threatened, Endangered, Candidate, and Proposed Plant Species

Federal land-managing agencies are responsible for implementing the ESA within their authorities. These responsibilities include, but are not limited to, efforts to promote the conservation and recovery of listed species and provisions to conserve the ecosystems upon which listed species depend. The U.S. Fish and Wildlife Service (USFWS) monitors and prescribes management for federally listed threatened and endangered plant species. The National Forest Management Act (1976) and Forest Service policy (FSH 2609.25 and FSM 2670 and FSM 2609) require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above minimum viable populations levels. A viable population is the maintenance of enough individuals throughout their range to perpetuate the existence of the species in natural, self-sustaining populations.

The USDA Forest Service, in implementing the ESA, must ensure efforts to promote the conservation and recovery of listed species and provisions to conserve the ecosystems upon which listed species depend. Table B-1 provides a list of those species that have state or federal status as Threatened or Proposed. Additionally, we have identified those species that have been identified as imperiled and may warrant listing as Threatened or Endangered by the Utah Native Plant Society and the Utah Natural Heritage Program (Utah Rare Plant Meeting Results 2000). There are no plants currently listed as endangered on the Wasatch-Cache National Forest.

Table B-1 Threatened, Candidate, and species likely to be Proposed as Threatened or Endangered on the Wasatch-Cache National Forest

Scientific Name	Common Name	Status	Distribution
Primula maguirei L. O. Williams	Maguire's Primrose	Threatened	Logan Canyon Endemic
Spiranthes diluvialis Sheviak	Ute ladies'-tresses	Threatened	Potential Habitat – through the Wasatch-Cache National Forest
Viola frank-smithii N. Holmgren	Frank Smith's Violet	Sensitive[1]	Logan Canyon Endemic
Dodecatheon dentatum Hook var. *utahense* N.H. Holmgren	Wasatch Shooting Star, Utah Shooting Star	Sensitive[1]	Salt Lake County Endemic
Draba maguirei C.L. Hitchc. var. *burkei* C.L. Hitchc.	Burke's Draba	Sensitive[1]	Northeastern Utah Endemic
Botrychium lineare W.H. Wagner	*Slender Moonwort*	*Candidate*	*Colorado, Oregon, Montana, Washington, (Historical sites in California, Idaho, Montana, Utah, Nevada and Quebec and New Brunswick, Canada)*

[1]Likely to be proposed, as Threatened or Endangered, because of rarity and/or because of potential threats

The Utah Native Plant Society and Utah Conservation Data Center identified three Intermountain Region Sensitive species, *Viola frank-smithii, Dodecatheon dentatum* var. *utahense,* and *Draba maguirei* var. *burkei,* (Utah Rare Plant Meeting Results 2000) that have sufficient threats and

conservation needs to be proposed as Threatened species. These species have not been formally petitioned or listed with the US Fish and Wildlife Service. However, these species could be listed in the foreseeable future and within the 10-year planning period. As listed species, special management efforts and conservation measures would be required under the ESA. Due to their current conservation needs and threats, these species will be examined separately from the other Intermountian Region Sensitive species. For each, we have provided detailed information regarding status, habitat information, threats, current condition, and management efforts. Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TES plants and plant species at risk or their habitat. Threats listed are not all-inclusive, but focus on those that have the most potential to adversely affect plant and habitat recovery, and the persistence of known populations.

Primula maguirei **(**Maguire's Primrose)
Maguire' Primrose was first collected in Logan Canyon, Utah in 1911 and was formally described as a new species in 1936 (Williams 1936). The US Fish and Wildlife Service officially listed *Primula maguirei* as Threatened in August 1985 (US Fish and Wildlife Service 1985). Currently, a total of 14 element occurrences of *P. maguirei* have been identified within a corridor of Logan Canyon approximately 19 km long and less than 1 km wide. The total global population of *P. maguirei* is estimated at 3000 individuals (US Fish and Wildlife Service 1990). Reproduction is thought to be strictly sexual, and *P. maguirei* is likely an obligate outbreeding species based upon the heterostylous floral structure (Richards 1993). Bees and flies have been observed visiting *P. maguirei* flowers, but specific pollinators have not been determined (Padgett 1986). Successful conservation of this species will require protecting occupied habitat and pollinator requirements in and around populations.

The narrow distribution and small population size of *P. maguirei* is likely best explained by its unique habitat requirements and need for calcareous substrates. There is no evidence to suggest that the range of *P. maguirei* is any more restricted at present than as indicated by historical botanical records (USDI USFWS 1990; Glisson 1995a; Wolf and Sinclair 1997). It is more likely a relict species that formerly had wider ranges when climatic conditions in North America were wetter and cooler. Current research and phylogenetic analyses of *Primula* spp. add support to this hypothesis (Richards 1993; Wolf and Sinclair 1997). The role of human intervention in the restricted range of this species is unknown. Potential and actual habitat within the canyon and along the canyon floor may have been significantly impacted by human activity due to development (USDI USFWS 1990).

Habitat – *Primula maguirei* is categorized as a mesophytic calciphile and is restricted to cool, moss-covered shallow soils on dolomite cliffs and boulders of the Laketown and Fish Haven Dolomite formations (USDI USFWS 1990, Glisson 1995a). Populations of *P. maguirei* are restricted to an elevational range of 1400 to 1800 meters (4,600 to 5,900 feet) along the lower canyon walls of Logan Canyon (Padgett 1986). Plants are often found in cracks or crevices or amidst well-developed mats of moss and is most often found in areas of cool, moist microclimates. Apparent differences in the moisture regimes of up canyon and down canyon populations have been documented (Padgett 1990). Extensive surveys of potentially suitable habitat (additional outcrops of Fish Haven and Laketown Dolomites) have been conducted in

adjacent drainages and in other portions of the Bear River Range of northern Utah and southern Idaho. No additional populations of *P. maguirei* have been located (Franklin, 1990).

Threats – The most significant threats facing *Primula maguirei* and its habitat are recreational rock climbing activities, the proposed realignment and expansion of U.S. Highway 89 in Logan Canyon, and horticultural collection (USDI USFWS 1990; Glisson 1995a; UDWR 1998a). Climbing activity in Logan Canyon has increased dramatically in recent years. The climbing community has participated in conservation efforts with the USDA Forest Service to identify potential conflict areas and to educate climbers about the presence of this species. With the understanding of the local climbing community, 21 climbs have been formally closed to ensure protection of this species (Glisson 1995a). A local climbing guide discusses the presence of *P. maguirei* and urges the cooperation of climbers to further protect this species and its habitat (Monsell 1998). The Record of Decision for the expansion of US Highway 89 identifies preventative measures that will be implemented to minimize potential impacts to the *P. maguirei* populations, which include limited vegetation removal, dust-suppression, and construction timing to prevent impacts during flowering (Glisson 1995a). The USDA Forest Service is responsible for ensuring that preventative measures are employed and that population viability is maintained.

Current Management – The US Fish and Wildlife Service prepared a Recovery Plan for *Primula maguirei* (1986) that has been in effect since 1990. The general provisions of the Recovery Plan include inventorying suitable habitat, conducting minimum viable population studies, managing activities that could affect populations or habitats, and developing techniques for artificially propagating plants for possible population expansion or establishment. Additionally, a Conservation Strategy for the Bear River Range Endemics, which includes *P. maguirei,* was prepared and signed in 1995 (Glisson 1995a). The general provisions of this conservation strategy include implementation of population biology monitoring studies to assess stability, trends, impacts from climbing and grazing activities, and autecology of all endemics. Direct provisions for *P. maguirei* include the development and implementation of specific research aimed at determing habitat dynamics, germination requirements, and phylogenetic relationships within and between populations. A progress report and amendment to the Conservation Strategy and Action Plan is currently in draft form. This amendment will provide new information and proposed changes to the existing strategy and will enhance conservation and recovery efforts for *P. maguirei* and the other Bear River Range Endemics. Additional efforts would include: finalizing a formal policy to address rock climbing; increasing genetic, germination and pollination research; and completing Conservation Agreements in consultation with US Fish and Wildlife Service.

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid)**

Ute ladies'-tresses orchid was named in 1984 and federally listed as threatened on January 17, 1992 under the Endangered Species Act as amended. *Spiranthes diluvialis* populations are found in relatively low-elevation riparian, spring, and lakeside wetland meadows in these general areas of the interior western United States: Populations have been found near the base of the eastern slope of the Rocky Mountains in SE Wyoming and north-central and central Colorado; in the upper Colorado River Basin; along the Wasatch Front and westward in the eastern Great Basin, in north-central and eastern Utah and extreme eastern Nevada. In 1994, the range was expanded

north by discoveries in central Wyoming and western Montana and in 1996, *S. diluvialis* was discovered in southeast Idaho, along the Snake River. The largest known population is found to the just south of the Wasatch-Cache National Forest in Diamond Fork Canyon on the Uinta National Forest. Reproduction is strictly sexual, with ground- and log-nesting bumblebees as the primary pollinators (Sipes and Tepedino 1995, Pierson and Tepedino 2000). Successful conservation of this orchid will require protecting suitable habitat and pollinator habitat in and around orchid populations.

Habitat - *Spiranthes diluvialis* is endemic to moist soils in mesic or wet meadows near springs, lakes, and perennial streams. The elevation range of known habitat in Utah 4,900 to 7,000 feet, but has been found as low as 1500 feet in surrounding states. Most of the occurrences are along riparian edges, gravel bars, old oxbows, and moist-to-wet meadows along perennial streams and rivers, although some localities are near freshwater lakes or springs. *S. diluvialis* appears to be well adapted to disturbances caused by water movement through flood plains over time. Populations are often found on point bars and other recently created riparian habitat. This orchid species appears to require permanent sub-irrigation, with the water table holding steady throughout the growing season and into late summer and early autumn. *S. diluvialis* occurs primarily in areas where the vegetation is relatively open.

Potential habitat for *Spiranthes diluvialis* can be found throughout the Wasatch-Cache National Forest, but occupied habitat has not yet been discovered. Extensive surveys for *S. diluvialis* were completed on the Wasatch-Cache and Uinta National Forests in 1992 (Stone 1993). Field surveys were focused on perennial streams draining out through the Wasatch Mountains, usually at elevations below 6,500 feet. No significant botanical finds were made for *S. diluvialis* on the Wasatch-Cache National Forest in this fairly comprehensive survey. Subsequent surveys each year following this study to present have also resulted in no significant botanical finds of this Threatened species (Padgett 2000b).

Factors in the life history and demography of this species often make it difficult to locate. Populations appear to fluctuate dramatically from year to year, making it difficult to assess population status and distribution. The genus *Spiranthes* also undergoes a dormant period that may last 7-10 years, apparently with no evidence of above ground structures. Currently, the factors involved in dormancy and the triggering mechanisms required are unknown. In order to locate this species, potential habitat must be surveyed every year before ground-disturbing activities take place.

Threats – *S. diluvialis* is found infrequently and in scattered locations. Threats include livestock grazing, trampling due to hiking and undeveloped recreation, exotic weed invasion, alterations of the hydrologic regime due to controlled flooding, dewatering of streams, loss of pollinators, and development (Stone 1994, US Fish and Wildlife Service 1995). Because it prefers open, early seral riparian areas, its management may be in direct conflict with rare fish habitat management that emphasizes undisturbed climax conditions.

Current Management - The US Fish and Wildlife Service has prepared a Draft Recovery Plan (US Fish and Wildlife Service 1995) and developed actions designed to restore populations and remove threats. The general provisions of the Recovery Plan include: obtaining information on

life history, demographics, habitat requirements, and watershed process; managing watersheds to perpetuate or enhance viable populations; and protecting and managing populations in wet meadow, seep and spring habitats.

The following is from Federal Register (1992):

> Except for two small populations in wetlands near Utah Lake, all known historic populations of this species (*S. diluvialis*) along the Wasatch Front in the populated north-central area of Utah are presumed extinct, as are all other known historic populations in the eastern Great Basin and two of the four known populations in Colorado. It is believed that alteration of riparian habitat caused the extinction of these populations. With the exception of the two Utah Lake populations, recent attempts to locate the Wasatch Front and eastern Great Basin populations were unsuccessful (Coyner 1989,1990).

While the potential for additional impacts to this species are limited, Wasatch-Cache personnel will continue to survey potential habitat before ground-disturbing activities take place.

***Dodecatheon dentatum* var. *utahense* (Utah Shooting Star, Wasatch Shooting Star)**
Dodecatheon dentatum var. *utahense* is a Salt Lake County, Utah endemic. It was described as a new taxon in 1994 (Holmgren) and is apparently restricted to Big Cottonwood Canyon in the central Wasatch Range. Little work to determine life-history characteristics, demography, or pollination requirements for this taxon has been completed (Padgett 2000b).

Habitat – *Dodecatheon dentatum* var. *utahense* is endemic to shady, moist cracks and crevices of rock outcrops, often in the spray of waterfalls (Holmgren 1994). The elevation range of known habitat is 2000 to 2900 m (6,400 to 9,500 feet). Four known populations have been identified in Big Cottonwood Canyon within an area of approximately 3 miles square (Welsh et al. 1993). Many surrounding seeps have been surveyed for the presence of *D. dentatum* var. *utahense*, though no new populations have been located. All of the surrounding seeps that were examined were higher in elevation and were above shading trees (Stevens and Padgett 1999).

Threats – Recreational impacts pose the greatest threat to *D. dentatum* var. *utahense* populations. All known locations are found along trails or in the vicinity of high recreational use areas. Hikers, picnickers, and climbers frequent the areas in which these populations currently exist. Soil instability along some trailside populations is so great that even minimal use and light walking along the trail causes the uprooting of plants (UDWR 1998a). Based upon the high use of the area, and the extreme impacts from picnic area use, hiking, and climbing this species is thought to be critically imperiled sufficient to warrant proposed listing as Threatened under the ESA (Utah Rare Plant Meeting Results 2000).

Current Management - *Dodecatheon dentatum* var. *utahense* is currently be considered for addition to the Region 4 Sensitive Species list for the Wasatch-Cache National Forest and is on the Utah Natural Heritage Program Tracking list (UDWR 1998a). It currently has no designation or proposed legal protection with the US Fish and Wildlife Service. Currently, no preventative

measures (i.e. fences, barriers) have been taken to exclude picnickers, hikers, or climbers from the fragile populations (Padgett 2000b).

***Viola frank-smithii* (Frank Smith's Violet)**
Frank Smith's Violet was first discovered in May 1989 by botanist Frank Smith and was formally described as a new species in 1992 by Holmgren (1992). *Viola frank-smithii* is known to occur only in the lower to middle portion of Logan Canyon and several of its main side canyons in the Bear River Range of northern Utah (Glisson 1995a). There are currently 11 known element occurrences that comprise a total global population of approximately 10,000 individuals (Stone 1994). Little is known about the life-history characteristics of *V. frank-smithii,* although it is thought to be a short-lived, sexually reproducing perennial species. Pollinators are likely required for seed set (Glisson 1995a).

Habitat - *Viola frank-smithii* is one of the few rock-dwelling violets known in North America (Holmgren 1992). It is endemic to cliffs and near-vertical outcrops of carbonate rock, specifically Limestone and Fish Haven and Laketown Dolomites. The elevation range of known habitat is 1646 to 2073 m (5,400 to 6,800 feet) with most populations occurring on cool, northerly exposures that are shaded for the majority of the day (Stone 1994). Surrounding vegetation, including Douglas fir and maples also provide additional shading for the microsites in which *V. frank-smithii* is found. Rock outcrops and aspects other than steep, north-facing slopes appear to be too warm and dry to support populations of *V. frank-smithii*. *Viola frank-smithii* is found in distinct microhabitats similar to that of *Primula maguirei* and these species are often found in close proximity (UDWR 1998a).

Threats – Not unlike *Primula maguirei,* the most significant threats to *Viola frank-smithii* and its habitat are recreational rock climbing activities, the proposed realignment and/or expansion of U.S. Highway 89, and horticultural collection (Welsh et al. 1993, Glisson 1995a, UDWR 1998b). As previously stated climbing activity in Logan Canyon has increased dramatically in recent years and has resulted in the removal of plants in areas where *P. maguirei* and *V. frank-smithii* are found. Efforts by the USDA Forest Service and the local climbing community have focused on education and the conservation of these species (Monsell 1998). As with *P. maguirei,* the Record of Decision for the Expansion of US Highway 89 identifies preventative measures that will be implemented to minimize potential impacts to the *V. frank-smithii* populations, which include limited vegetation removal, dust-suppression, and construction timing to prevent impacts during flowering (Glisson 1995a). The USDA Forest Service is responsible for ensuring that preventative measures for *V. frank-smithii* are employed at the same level of care as defined for *P. maguirei* and that population viability is maintained.

Current Management – A Conservation Strategy for the Bear River Range Endemics, which includes *Viola frank-smithii* was prepared and signed in 1995 (Glisson 1995a). This conservation strategy includes provisions that would promote implementation of population biology monitoring studies to assess stability, trends, impacts from climbing and grazing activities, and autecology of all endemics. Additionally, this strategy provides direct provisions for *V. frank-smithii,* which include the development and implementation of specific research aimed at determining habitat dynamics, germination requirements, and pollination, seed set, and dispersal requirements. A progress report and amendment to the Conservation Strategy and

Action Plan is currently in draft Form. This amendment will provide new information and proposed changes to the existing strategy. Completing Conservation Agreements in consultation with US Fish and Wildlife Service and establishing an interagency Technical Team to oversee implementation of the Conservation Strategy and Action Plan will further enhance conservation and recovery efforts for all the Bear River Range Endemics.

***Draba maguirei* var. *burkei* (Burke's Draba)**
Maguires draba was described for the Bear River Range and the northern Wasatch Mountains of Northern Utah. It was further divided into two varieties (*Draba maguirei* var. *maguirei* and *Draba maguirei* var. *burkei*). Subsequent taxonomic and phylogenetic research has shown that variety *burkei* is a distinct species (Windam and Beilstein 1998) and will be elevated to the species level. Efforts to publish Burke's draba as a new species are currently being made (Padgett 2000b). A total of 13 populations are known, ranging from the Wellsville Mountains, Strawberry Peak, and James Peak (Padgett 2000b). Burke's draba appears to require a cross-pollination to set seed, though a pollen vector has not been determined for this taxon (Windham and Beilstein 1998).

Habitat – Burke's draba populations occur on ledges and in crevices of exposed carbonate and quartzite outcrops and on the adjacent rock loam soils in Douglas fir and mixed conifer communities. The elevation range for this taxon is 1650 to 2975 m (5,400 to 9,765 feet). Lower elevation populations appear to be confined to steep slopes with shady north and easterly aspects while higher elevation populations appear to occur on all aspects. Plants appear to prefer open filtered light in protected microhabitats and in association with semi-barren herbaceous plant communities (USDA USDI 2002).

Threats – The Snowbasin population, the largest known population of Burke's draba, has had the greatest impacts and threats to population viability. Many plants have been removed from near Mt. Allen in order to build a ski run for 2002 Olympics men's downhill event. Additionally, a large number of plants in this population were destroyed as a result of rock overburden being placed over a large portion of the population during a road construction project for the City of Ogden's communication site (Padgett 2000b). The other known potential threats to Burkes draba are from recreational activities and from mountain goats recently transplanted near Willard Peak. Recreational impacts include hiking, trail use, and rock scrambling. Impacts from the mountain goats include trampling and other physical damage. Plants appear to be too diminutive to be eaten (Padgett 1998).

Current Management – *Draba maguirei* var. *burkei* is currently a Sensitive species on the Region 4 Sensitive Species list for the Wasatch-Cache National Forest and is on the Utah Natural Heritage Program Tracking list (UDWR 1998a). It currently has no designation or proposed legal protection with the US Fish and Wildlife Service. Due to the existing threats to this taxon and its conservation needs, it was suggested by the Utah Native Plant Society (2000) that *D. maguirei* var. *burkei's* status be elevated to Threatened with the US Fish and Wildlife Service. Forest Service ecologist, biologists, and managers are currently preparing a Conservation Assessment and Strategy for *Draba maguirei* var. *burkei* (USDA USDI 2002). This Conservation Assessment and Strategy outlines management objectives that upon implementation will maintain the viability of populations, provide research opportunities to

determine life history, demography, ecology, and factors contributing to rarity, and establish monitoring protocols for Burke's draba.

Botrychium lineare (Slender Moonwort)
The Federal Register (USDI ISFWS 2002a) describes *Botrychium lineare* (Slender Moonwort) in the following manner:

> ***Botrychium lineare*** is a small perennial fern that is currently known from a total of nine populations in Colorado, Oregon, Montana, and Washington. In addition to these currently known populations, historic populations were previously known from Idaho (Boundary County), Montana (Lake County), California (Fresno County), Colorado (Boulder County), and Canada (Quebec and New Brunswick). However, they have not been seen for at least 20 years and may be extirpated (Wagner and Wagner 1994). Since the 12-month petition finding was published we received some additional information regarding the status and distribution of *B. lineare*. Two new population sites of *B. lineare* were tentatively identified in 2001, one site each in Idaho and Nevada, with an additional historic site discovered from a herbarium specimen collected in Utah in 1905.

The Utah herbarium specimen was collected at Silver Lake in Big Cottonwood Canyon in 1901 at approximately 2650 m (8,700 feet) elevation. Attempts to relocate this population on the meadows surrounding Silver Lake in both 2001 and 2002 were unsuccessful. But because of its diminutive size and its ability to remain below ground during periods of low precipitation (Farrar 2002), it is possible for this plant to still exist on this site. Because of possible impacts to potential habitat, surveys were also conducted on private lands around Lake Solitude in 2002. No plants were found.

Habitat

Describing the habitat requirements for this species is difficult because of its current and historically disjunct distribution. It occurs at sea level in Quebec to nearly 3,000 meters (9,840 ft) Colorado. *Botrychium lineare* may be a habitat generalist and is often found along disturbed roadsides. Farrar (2002) stated that it commonly occurs where a combination of sedges, grasses, and small forbs such as wild strawberry, common cinquefoil, and aster grow in combination. It may also be that this species is more common than currently known because it is difficult to observe in the wild for reasons noted above.

Threats

Threats identified in the Federal Register (USDI USFWS 2002) include road maintenance, herbicide spraying, recreation, timber harvest, trampling, and development. It was also noted that livestock or wildlife grazing might affect *Botrychium lineare*, but that these effects are currently unknown. None of these threats occur at the historic collection site at Silver Lake. Livestock grazing has not occurred on this species' historical range for over a century. The construction of a raised boardwalk in the mid 1990's to protect the fragile wetland habitats from trampling (recreation use), has also eliminated threats from road maintenance, and development. No herbicides are currently used in vicinity of Silver Lake. Timber harvest occurred in the early

1900's to support mining activities in the area, but now is restricted to maintenance of ski runs at both Brighton and Solitude Ski Area adjacent to Silver Lake. Farrar (2002) noted that *Botrychium lineare* has been found on constructed ski slopes elsewhere so this treatment may have a positive effect on this species.

Current Management

Botrychium lineare is not currently on the U.S. Forest Service, Intermountain Region sensitive species list and is not currently given any formal consideration. The U.S. Fish and Wildlife Service has concluded that "…the overall magnitude of threats to *B. lineare* throughout its range is moderate and the overall immediacy of these threats is non-imminent" (USDI USFWS 2002). They assigned this species a listing priority number of 11 and any additional information they receive on the distribution, threats, and conservation actions associated with Botrychium will influence their determination on whether listing under the Endangered Species Act is still warranted.

Selection of Species for Analysis

Forest Service ecologist and botanists compiled existing information of rare or potentially rare plant species from the Intermountain Region Sensitive Species List, and lists maintained by the Utah Native Plant Society and Utah Conservation Data Center (UCDC). Information on the biology, demography, current threats, and distribution of these plant species was obtained from current scientific literature, technical reports, monitoring and inventory reports, professional expertise, and the UCDC.

All plant species with global (G) ranking of G1-G3 or Utah state ranking of S1-S2 (Utah Rare Plant Meeting Results 2000) known to occur on the Wasatch-Cache National Forest were examined for analysis. Global and State rankings are based on a system developed by The Nature Conservancy and used by the Natural Heritage and Conservation Data Center network. These rankings serve as a reflection of the overall status of a species throughout its global and State range. The global system is a one-through-five ranking system, ranging from species considered globally rare (G1-G3) to those rare in Utah (G4-G5).

- A G1 ranking refers to those species that are critically imperiled globally because of extreme intrinsic rarity or because of some factor of its biology making it vulnerable to extinction and typically have fewer than 5 viable occurrences (Utah Plant Report, 2000).

- G2 species are defined as those that are imperiled globally because of rarity or because other factors may increase its vulnerability to extinction throughout its range (6 to 20 element occurrences).

- G3 are those species that are vulnerable, either due to rarity or vulnerability of other factors (21 to 100 element occurrences).

- G4-G5 species are apparently secure (usually more than 100 element occurrences) but typically have cause for long-term viability concern.

All G1-G3 species were included for evaluation in the effects analysis, unless documentation was provided that any given species did not require sensitive status (e.g., new population data or increased occurrence data provided after the original G-rank assignment). The state of Utah, through the UCDC and the Utah Native Plant Society, also assigns state rankings. Like the global ranking system, the state system is a five-level ranking system, ranging from species considered extremely rare in the State. A species that is rare in one state, however, may range from being rare to common globally. The definitions for the state rankings correspond to the global and state rankings. All species ranked S1-S2 were included in the evaluation for effects analysis.

The preliminary list of rare species to be evaluated included many species. From this list, it was determined which species should be included in the effects analysis, which additional species of concern should be added, and which of those species should be removed because they were considered secure enough to drop from a list of “watch” plants. The resulting rare plant list (Appendix F, Tables F-1 and F-2) comprises the best available information on rare plant species either known to occur on the Wasatch-Cache or, on adjacent lands and have potential habitat on the Forest. Those species that have known special management needs to maintain their long-term viability are of primary concern. Species needing special protection on public lands include those: 1) designated as Endangered or Threatened under the ESA (or proposed as Threatened or Endangered), 2) proposed or candidate species under consideration for designation under ESA, and 3) on the Intermountain Region’s Regional Forester Service Sensitive Species List, both current and proposed (see Table F-1).

Additional consideration has been given to “watch list” plants regarding their management. Utah Natural Heritage Program defines watch list plant species as those that are regionally endemic but without range wide viability concern. Some watch list plants do not meet all criteria for being designated as sensitive species, but may need to be tracked because of their local rarity of because sufficient population viability concerns exist. Other may meet the criteria for being classified as Forest Service Sensitive, but because of the lack of current threats warrant a lower level of concern. Watch list plant species are not evaluated for effects in the plan revision process.

Sensitive Species and Species at Risk

Plant species are designated "Sensitive" by the Regional Forester because their populations or habitats are trending downward, or because little information is available on their population or habitat trends. A six-step process is now used to determine whether a plant is designated as sensitive (USDA Forest Service 1999f). The primary purpose of the Sensitive Species Program is to maintain viability and to conserve or restore habitat conditions for designated species, in order to prevent them from becoming federally listed.

The initial Intermountain Region Sensitive Plant Species List was published in 1988-1989, and later updated in 1995. New information about sensitive plant habitats, occurrence, successional relationships, potential threats, and disturbance response has become available in the last 10 years. Another revision of the Sensitive Species List is expected in mid-2001. The list is likely to expand the number of plant species that potentially occupy habitat on the Wasatch-Cache

National Forest. The number of endemics included in this list is also expected to increase. Endemic plants are defined as those that are restricted to a specific locality or region. Regional Endemics are defined as species with a distribution is contained between 100 and 10,000 square miles, while local endemics have a distribution that is less than 100 square miles.

The Wasatch-Cache currently has 14 plant species that are designated as Sensitive on the Region 4 Sensitive Species List. An additional 14 species are recommended Sensitive to be added to the updated Region 4 Sensitive list. In addition to the current or proposed sensitive species an additional 17 plant species at risk or watch list species have been identified as occurring on, or having potential habitat within the Wasatch-Cache National Forest. These 48 species represent the set of species at risk for the effects analysis presented here. Table B-2 summarizes the endemism of these species. The life form and taxonomic groupings of these species (along with the six TEP species) are summarized in Table B-3. Appendix F, Table F-1 provides a complete list of these species, their global and state status, endemism, and global and geographic unit distribution. Appendix F, Table F-2 provides information on habit, life form, habitat group, and plant status (US Forest Status and recommended status by UCDC).

Table B-2. Endemism and Distribution of Threatened and Sensitive (current and proposed) Plant Species

Endemism and Distribution	Number of Species
Endemic to the Wasatch-Cache National Forest (all populations on FS lands)	6
Endemic to the state of Utah	17
Endemic to the Central Wasatch Mountains	10
Endemic caliciphiles in the Bear River Range	7
Endemic to seasonally to permanently moist wet areas in Utah	6
Endemic to Salt Lake County, Utah	1
Endemic to the Wasatch Mountain Range	3
Paleoendemics – relict species	2
Sparsely distributed (found throughout several states but in isolated populations)	6
Regional Endemics (distribution is contained between 100 and 10,000 square miles)	14
Local Endemics (distribution is less than 100 square miles)	18

Table B-3. Life-form and Taxonomic Groupings of Threatened, Proposed and Sensitive (current and proposed) Plant species

Life-form and Taxonomic Grouping	Number of Species
Vascular Plants	48
Ferns and Fern Allies	1
Perennial Herbs	42
Annual and Biennial Herbs	3
Shrubs	1
Trees	1
Non-vascular Plants	0

Environmental Consequences

Resource Protection Measures

Laws, Regulations, and Policies - Threatened, Endangered, proposed, or candidate species have special management requirements for all Forest Service management activities. Conservation Assessments, Strategies, and Agreements, along with Recovery plans (described above), currently established for the these plant species within the Wasatch- Cache will be met and upheld to ensure the viability and conservation of these species.

Sensitive species will be managed to ensure their population viability and preservation. The Forest Service management policy (FSH 2609.25 and FSM 2670) ensures that for all TEPS plant species, the following measures will be taken: (1) biological evaluations will be written for all activities that may impact sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered, or proposed species, and (3) sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. This Forest Service management policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

Wasatch-Cache Forest Plan Direction and Implementation – There are inherent risks and uncertainty in attempting to determine the overall effects of management activities on TES plant species and rare plant communities at a Forest Plan level. Many of the species analyzed in the effects analysis presented here may be beneficially or detrimentally affected by the activities emphasized by each Management Prescription Category (MPC) for each alternative. Rare communities, not unlike rare species, may also increase or decrease in abundance or quality based upon activities associated with alternative emphasis or prescription categories. To provide for viability and conservation of all plant species and communities, mitigation measures would be implemented at the appropriate scale for all alternatives. These measures include specific standards and guidelines that are to be used in analysis, implementation, and monitoring at both the forest wide and site-specific project level. Additionally, these measures strive to maintain or restore the distribution of native plant communities and special habitat features within the Wasatch-Cache National Forest.

Detailed goals, standards, guidelines, and management area direction for botanical resources that focus on maintaining population viability, ecological processes, and native plant communities are included in the proposed forest plan.

General Effects

The current threats known for TES plants and species at risk were identified previously in this section. These threats are assessed below for their direct and indirect effects to plant populations and habitats. Impacts were grouped into six management actions that have the most potential to affect plants: 1) recreational activities, 2) mechanical activities, 3) livestock grazing activities, 4) Ski areas and associated activities, 5) fire (fire use and wildland fire), and 6) non-native species invasion. The intensity and spatial extent of the management actions would vary by alternative;

however, the general impacts to plants associated with each of the management actions are described below.

Effects on Botanical Resources from Roads and Access Management

Roads increase access to and fragment habitat and provide an avenue for weed invasion. They are often placed on ridge tops, in riparian areas, or through scree slopes, which are important habitats for a large number of species on the Wasatch-Cache National Forest. Reconstruction and maintenance of existing roads can directly or indirectly affect plant populations by introducing competitive weeds and altering availability of light, nutrients, and moisture.

Effects on Botanical Resources from Timber Harvest

Mechanical activities include vegetation management treatments, whether for restoration or to meet growth and yield objectives. Activities such as timber harvest can have impacts to plants and plant habitat through canopy removal, soil disturbance and erosion, and stream sedimentation. In addition, mechanical activities for vegetation treatment may require road building (see above). Sudden changes in seral stage, or an abundance of early seral stages, also reduce the available habitats for those plants that require mid to late seral stages. However, those species that prefer openings, early-seral stages, or some ground disturbance, could benefit from moderate levels of mechanical activities. Changing patch dynamics across the landscape could also have effects to TES plant species.

Forest-dependent species, such as brownie lady's slipper (*Cypripedium fasciculatum*) and Maguire's draba (*Draba maguirei* var. *maguirei*), which typically occur in the understory of conifer forests, occur outside potential timber harvest areas regardless of Alternative. Other species such as Maguire's primrose (*Primula maguirei*), Frank Smith violet (Viola frank-smithii), and Cronquist daisy (*Erigeron cronquistii*) are typically associated with shaded rocky habitats beneath a conifer understory. Where these species occur, again is outside potential timber harvest areas regardless of Alternative.

Effects on Botanical Resources from Vegetation/Fuels Treatment

Mechanical activities include vegetation management treatments, whether for restoration or to meet growth and yield objectives. Activities that mechanically remove fuels and/or canopy cover can alter the microhabitat of various rare plant species. As noted with timber harvest above, sudden changes in seral stage, or an abundance of early seral stages, also reduce the available habitats for those plants that require mid to late seral stages. However, those species that prefer openings, early-seral stages, or some ground disturbance, could benefit from moderate levels of mechanical activities.

None of the alternatives proposes any vegetation treatments in rare plant habitat, unless it would maintain or improve conditions required by these species. Mechanical treatments of oak are the greatest in Alternative 7 and are proposed primarily along the urban interface (20,000 acres). The greatest potential for impacts to rare plants would be through access with mechanical equipment across habitat, because none of our plant species at risk are likely to occur in these

dense oak stands. Some fuels treatments could occur in the Douglas-fir stands that provide cover for species such as Maguire's draba. Any treatment would remove fuels and avoid impacts to these rare species.

Effects on Botanical Resources from Recreation

Recreational activities on the Wasatch-Cache National Forest pose many of the major threats faced by TES plants and plant species at risk. The most important direct impact related to recreation is trampling, both by hikers and ORV use (Liddle 1975, 1991). These types of activities particularly threaten many TES plants and plant species at risk. Unauthorized ORV use has resulted in a significant impact to *Draba maguirei* var. *burkei* in the Willard Peak area. Road building and the development of campgrounds and other facilities used by recreationists also contribute to plant impacts, as these developments make more areas accessible and concentrate use. Undeveloped camping and recreation have similar impacts, which are more difficult to monitor. Parking areas, particularly undesignated areas, pose similar impacts to plants. The long-term impact of bisecting the population to functions such as reproduction and dispersal are still unknown. Other recreational impacts include ORV use, which can also disturb soil, affecting both habitat and potential habitat. Roads and trails for recreational use can contribute to the spread of noxious weeds, and increase the accessibility of areas to native ungulates and livestock, which can increase the impacts of trampling, herbivory, and congregation. Rock climbing in some portions of the Wasatch-Cache National Forest has threatened the viability of those species that occur on those habitats and these are most common in the Cache-Box Elder and the Central Wasatch Management Areas. The practice of clearing crevices in the rock of vegetation to improve climbing conditions may result in the direct loss of some of our most rare species on the Forest.

Cryptogamic soil crusts can be affected by unauthorized ORV use. The greatest potential for this is in areas where these crusts are most likely to occur, the Stansbury Mountains. No alternatives propose additional road building in this area because no timber harvest or oil and gas exploration occur here. On the other hand, no roads or trails are recommended for closure for wilderness recommendations under any alternative in this area either.

The Wasatch-Cache National Forest is home to some of the largest ski areas in the state of Utah. Snowbird, Solitude, Snowbasin, Brighton, and Alta are all within the forest boundary. Several species are directly impacted by the activities associated with ski areas including *Ivesia utahensis*, *Draba maguirei* var. *burkei*, and *Jamesia americana* var. *macrocalyx*. Threats from ski areas include direct trampling, mechanical construction, increased roads and facility development, increased summer recreation, and habitat fragmentation. Additionally, impacts from snowmaking and avalanche control could directly and indirectly effect populations of TES plants and plant species at risk. The production of snow requires a large support of electrical lines, waterlines, compressor and pump buildings, and other support structures, which could directly impact TES plants and plant species at risk and their habitats. Additional impacts to rare plant species could result from increased snow due to packing and grooming and avalanche control and could result in extended time needed for snow melt in the spring. Those species in the forested habitat and rock outcrop habitat groups could be impacted by expansion efforts of existing ski areas as well.

Effects on Botanical Resources from Livestock Grazing

Most of the rare plant species that occur on the Forest do not occur in habitat or portions of the forest that are currently grazed by domestic livestock. Various direct and indirect impacts, however, are associated with livestock grazing. Direct impacts include livestock trampling, herbivory, congregation and associated soil disturbances. Indirect impacts are more varied and can include the increased potential for the spread of noxious weeds and associated herbicide spraying, the introduction of exotic species, and changes in species composition and density of grasslands, shrublands, and woodland environments. These changes often affect the habitat available for TES plants and plant species at risk. Livestock often utilize and congregate in riparian areas and meadows, which can also alter species composition and change the habitat available to TES plants and plant species at risk. Additionally, changes in vegetation and bank stability can affect hydrological cycles, further stressing plants that depend on stable hydrological conditions. At the same time, plants in the Intermountain West have evolved with herbivory by insects, rodents, and wildlife species, thus some plants may benefit from grazing at appropriate intensity levels.

Cryptogamic soil crusts, where they are most likely to occur (Stansbury Mountains), have likely been and continue to be impacted by livestock grazing except outside of existing livestock allotments. One of the vacant allotments in that area is proposed for closure under Alternative 1. This allotment has approximately 6,200 acres of sagebrush and pinyon-juniper vegetation cover types. These types have the greatest potential for cryptogamic soil crust habitat, which is about 9 percent of the lands managed by the Forest Service in the Stansbury Mountains. Alternative 1 would therefore have the greatest potential to protect these habitats in the future. Because this allotment has been vacant for several years, however, and because there is a very low potential to restock this allotment given the cost of doing so, all alternatives will have a similar impact to cryptogamic soil crusts over the short term of this planning period.

Effects on Botanical Resources from Non-native plant invasion and Noxious Weeds

Noxious weeds directly affect plants and plant populations through competitive displacement. Indirect impacts include herbicide spraying and mechanical ground disturbance to control noxious weeds once they gain a foothold. Competition from invasive non-native species and noxious weeds can result in the loss of habitat, loss of pollinators, and decreased TES plants and plant species at risk viability. Roads, trails, livestock, and canopy reduction can provide ideal pathways for the introduction of exotic and non-native species. Indirectly, herbicide spraying can destroy populations of native pollinators by contaminating nesting materials and pollen resources (Pierson and Tepedino 2000), further decreasing the viability and reproductive success of TES plants and plant species at risk. Some species of non-native plants will alter hydrological regimes, changing and reducing the habitat available to TES plants.

Effects on Botanical Resources from Wildlife Management

Wildlife management generally does not have an effect on botanical resources. The greatest potential for impacts is from transplanted mountain goats that occupy habitat for several plant

species at risk. No alternative alters the potential for transplantation of Mountain goats and, therefore, effects are the same under each alternative.

Effects on Botanical Resources from Oil and Gas Activities

Oil and gas activity, while having the potential to impact plant species at risk, occurs in a portion of the forest with few rare plant species. Uinta greenthread (*Thelesperma pubescens*) is the closest species to the oil and gas exploration area, but is protected in each alternative from potential impacts.

Effects on Botanical Resources from Fire Management

Fire can be used as a tool to accomplish management goals and objectives as well as pose major threats through uncharacteristic wildfires. Mechanical preparation of fuels may be needed before fire use. As the potential for spring burning increases to meet fire use goals, the potential impacts to many plants increases. Most plants are not adapted to fire at this time of year. Spring burning interferes with flowering, fruiting, and other physiological impacts, and could affect life history patterns with pollinators. However, these risks need to be weighed against the risks of uncharacteristic wildfire and long-term habitat loss of plant species. Fire use to restore the historic fire regime could benefit these open-gap forested species in the long term. Wildfires can pose risks to some of the TES plants, particularly when the fires are uncharacteristic. In general, most plant species would benefit by the restoration of more historical fire regimes. There are also direct and indirect impacts to plants associated with wildfire suppression activities, such as road building and other mechanical activities, salvage logging, reforestation following fire, and the increased potential for the spread of noxious weeds.

Effects on Botanical Resources from Roadless Area Management

Roadless area management, especially when it has a non-motorized ROS, would be beneficial to rare plant species because the likelihood for impacts from management activities or recreational activities would be minimal. Alternative 1 manages nearly all roadless areas (over 605,000 acres) as non-motorized and Alternative 2 manages just over 540,000 acres as non-motorized. These alternatives would have the least effect on botanical resources. Alternative 6 manages nearly 300,000 acres as non-motorized, Alternative 7 manages almost 275,000 acres and Alternative 3 manages more than 230,000 acres as non-motorized. Alternative 4 manages more than 130,000 acres as non-motorized, while Alternative 5 manages less than 170,000 acres of the roadless areas as non-motorized.

Effects on Botanical Resources from Special Designation

Special designations, either research natural area (RNA) or special interest area (SIA) would be beneficial to rare plant species because the likelihood for impacts from management activities or recreational activities would be minimal. RNA status would be the most restrictive, while SIA status would manage for the botanical values for which they are established. Alternative 2 provides the most protection by designating over 5,500 acres of RNAs and nearly 32,500 acres of SIAs. The SIAs in this alternative were, for the most part, directed at maintaining botanical

values of both rare plant species and rare communities, such as Tall Forb communities. Alternatives 1, 6, and 7 are similar to one another in the protection they provide, but this is between 14,000 and 16,000 fewer acres. Alternatives 3, 4, and 5 each provide approximately 6,200 acres of protection through RNA and/or SIA designation.

Evaluation of Risk and Uncertainty

There are limitations in determining the impacts of the complex set of proposed actions under each alternative for the current sensitive, recommended sensitive, and watch list species (Threatened and suggested Proposed were analyzed separately) when assessing effects for the entire Wasatch-Cache National Forest. Causes of rarity can vary greatly for individual species. Species may be intrinsically rare or rare as a result of anthropogenic interference (Kruckeberg and Rabinowitz 1985). Other plant species may be rare due to their population ecology, evolutionary history, or basic reproductive biology. Historical or current anthropogenic activities may also contribute to the current distribution of these rare species. It is assumed in this analysis that certain management actions may promote or detract the potential long-term viability of TEPS plant species, or may increase or decrease the availability or quality of habitats that support these TEPS plant species.

Degree of Active Management by MPC

The potential impacts of each management prescription category (MPC) were ranked as low, moderate, or high based on the definitions and objectives for each prescription category (see Appendix D-1). The potential impacts to the TES plants and plant species at risk were ranked for the five management actions (fire, livestock grazing activities, recreational activities, mechanical activities, noxious weed invasion, ski areas) that have the most potential impacts to plants. These rankings are displayed in Table B-16.

Limitations of Using Habitat Groups

The habitat group methodology employed in this effects analysis may overlook key features of plant habitat and ecology. Ecological interrelationships such as pollinators and their viability requirements, or mycorrhizal associations, are often important features that are necessary for the continued survival and viability of TES plant species and plant species at risk. Such factors may not be accounted for by using broad habitat categories to classify TEPS plant species. In natural ecological systems, the factors that contribute to the physiognomy and distribution of species often occur as a continuum, not as discrete categories named habitat groups. Soil moisture, soil type, microsite moisture conditions, canopy closure, temperature, and light conditions often occur along a gradient. Individuals or populations of TES plant species occur along this gradient in a wide range of conditions. The use of habitat groupings is an attempt to begin capturing this variation of ranges and to bring like species together. The scale we are using to bring together these associations cannot possibly capture all of the environmental characteristics and intrinsic features necessary for the successful establishment and continued viability of TES plant species.

Table B-4. Rating of Potential Impacts on TES Species and Habitats by MPC

MPC	Fire Use	Grazing	Recreation	Mechanical	Noxious Weeds	Ski Areas
1.1	Moderate to high	Low to moderate	Low	None	Moderate	None
1.2	Moderate to high	Low to moderate	Low	None	Moderate	None
1.3	Moderate to high	Low to moderate	Low to moderate	None	Moderate	None
1.4	Moderate to high	Low to moderate	Low to moderate	None	Moderate	None
1.5	Moderate to high	Low to moderate	Low to moderate	Low to none	Moderate	None
2.4	Low to moderate	None	Low to moderate	Low to none	Low to moderate	None
2.5	None to low	Low to moderate	Moderate to high	Low to moderate	Moderate to high	None
2.6	Low to moderate	Low to moderate	Low to moderate	Low	Low to moderate	None
2.7	Low to moderate	Low to none	Low	Low to none	Low to moderate	None
3.1	Low to moderate	Low to moderate	Low	Low to none	Moderate	None
3.2	Moderate	Low to moderate	Low	Low to moderate	Moderate to high	None
4.1	Moderate to High	Moderate	Low	Low to none	Low to none	None
4.2	Low to moderate	Low to moderate	Low to moderate	Low to none	Low to moderate	None
4.3	Low to moderate	Low to moderate	Low to moderate	Low to moderate	Moderate to high	Low to none
4.4	Low to moderate	Low to moderate	Moderate to high	Low to moderate	Moderate to high	Low to none
4.5	Low	None	Moderate to very high	Moderate	Moderate to high	Moderate to high
5.1	Moderate	Low to moderate	Moderate	Moderate to high	Moderate	None
51/6.1	Moderate	Low to moderate	Moderate	Moderate to high	Moderate to high	None
5.2	Low	Low to moderate	Moderate	Moderate to high	Moderate to high	None
5.2/6.2	Low	Moderate to high	Moderate	Moderate to high	Moderate to high	None
6.1	Moderate	Low to moderate	Moderate to high	Moderate to high	Moderate to high	None
6.2	Moderate	Moderate to high	Moderate	Moderate to high	Moderate to high	None
8.0	Low to moderate	Moderate	Low to moderate	Low to moderate	Moderate to high	None
8.1	Low to moderate	Moderate	Low to moderate	Low to moderate	Moderate to high	None

Limitations of Extrapolating Effects Analysis for TEPS Species to the Wasatch-Cache Flora

The habitat group concept is based upon the habitat requirements of the current or proposed sensitive species and plant species at risk identified within the Wasatch-Cache. The habitat distribution of these rare plant species is not representative of the entire flora of north-central Utah, and should not be treated as such. Many of the plant species at risk have rather unique habitat requirements, such as edaphic characteristics, microsite limitations, or ecological associations. Many species may be intrinsically rare, newly evolved, or may be relicts. An additional limitation of this analysis is based upon the limited spatial data for potential habitat of TEPS plant species. Only those species with known element occurrences (UDWR UDNR 2002) within the Wasatch-Cache were included in the analysis. Spatial data of potential habitat for most TES species is not currently available. An analysis of the entire Wasatch-Cache flora has not been designed or attempted at this time.

Assumptions of Implementation of Standards, Guidelines, and Forest Service Directives

The viability of the plant species at risk and their respective habitats will be promoted with implementation of standards and guidelines, inventory and monitoring, and adherence to Forest Service directives for threatened, endangered, proposed, and sensitive plant species. Consistent implementation of standards and guidelines and adherence to Forest Service Management Policy across the Wasatch-Cache National Forest for all alternatives is mandatory for TES plant species conservation.

Measures and Factors to Assess Effects

Measures Used to Evaluate Effects on Threatened, Endangered, and Proposed Species

Current and potential threats to each individual threatened, endangered, or proposed (including candidate species) species were determined from current scientific literature and professional botanical knowledge and expertise (summarized in Appendix F Tables F-3, F-4, and F-5; and above, under Current Conditions). Using GIS technology, a map with an overlay of MPCs and the most current distribution information for element occurrences of TEP plant species (UDWR UDNR 2002) was created for each alternative. The ratings of potential impacts (Table B-16) for TEP species and habitats by MPC were then used to determine the overall effects of the MPCs for each individual Threatened or proposed species by alternative.

Direct and Indirect Effects by Species

Threatened, Endangered, and Proposed Species

Primula maguirei (Maguire's Primrose)

The threats for potential impacts due to recreation and associated activities are moderate to high under all alternatives. However, alternative 5 may pose the highest risk to the populations and potential habitat for *Primula maguirei.* In this alternative, a high proportion of the habitat area and populations are assigned to MPC 2.5, followed by MPC 5.1. The impacts from recreation in MPC 5.1 are moderate to high as are the risks of invasion from noxious weeds. Recreational climbing and its impacts have been identified, currently, as posing the highest threats to this threatened species (see above and Appendix F). Alternative 4 poses the second greatest risk to

the populations of *P. maguirei* due to the high proportion of populations assigned to MPC 2.5. Additionally, several populations occur in MPC 6.2, which pose moderate to high risks from noxious weed invasion, and fire. These populations, while occurring in grazing allotments, do not receive grazing pressures because of the severe cliff habitat of this threatened species. Many of the threats from mechanical activities and fire are minimized to due the extreme nature of the habitat. In many populations, the existing overstory of Douglas-fir provides for microhabitat necessary to maintain this species. Thus, fire could negatively impact these populations. Alternatives 1, 2, 3, and 6 pose similar and intermediate impacts to the *P. maguirei*, with recreational activities posing the greatest risk to population viability.

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid)**
While Potential habitat occurs for *Spiranthes diluvialis* within the boundary of the Wasatch-Cache National Forest recent surveys have not found this species. Historic occurrences of this species were off the Forest. The potential for moderate levels of impact to potential habitat for this threatened species are common to all alternatives. However, *S. diluvialis* populations occur in riparian habitats and fall into RCAs. Within these RCAs, the management emphasis for any proposed action is to either maintain current conditions or to achieve desired conditions. Therefore, only those actions that would benefit riparian resources over the long term are permitted and impacts may be minimized.

***Viola frank-smithii* (Frank Smith Violet)**
Like *Primula maguirei*, the threats for potential impacts due to recreation and associated activities are moderate to high under all alternatives. However, alternative 5 may pose the highest risk to the populations and potential habitat for *Viola frank-smithii.* In this alternative, a high proportion of the habitat area and populations are assigned to MPC 5.1, followed by 2.5. Because of the proximity to Logan Canyon and the habitat on which this species occurs, the impacts from recreation, primarily climbing, in MPC 5.1 are moderate to high. Recreational climbing and its impacts have been identified, currently, as posing the highest threats to this threatened species (see above and Appendix F). Alternative 4 poses the second greatest risk to the populations of *V. frank-smithii* due to the high proportion of populations assigned to MPC 2.5. Additionally, several populations occur in MPC 6.2, which pose moderate to high risks from noxious weed invasion, and fire. These populations, while occurring in a grazing allotment, do not receive grazing pressures because of the severe cliff habitat of this threatened species. Many of the threats from mechanical activities and fire are minimized due to the extreme nature of the habitat. In many populations, the existing overstory of Douglas-fir provides for microhabitat necessary to maintain this species. Thus, fire could negatively impact these populations. Alternatives 1, 2, 3, and 6 pose similar and intermediate impacts to the *D. frank-smithii*, with recreational activities posing the greatest risk to population viability.

***Draba maguirei* var. *burkei* (Burke's Draba)**
Under all alternatives, the risks from recreation and associated activities are moderate to high. Alternative 5 may pose the highest risks to the populations and habitats of *Draba maguirei* var. *burkei* due to impacts from recreation and noxious weeds. Many of the populations are located along trails and may be impacted by increased use. Alternatives 1, 2, 3, 6 and 7 may pose the least impacts to *D. maguirei* var. *burkei* because of the large proportion of populations assigned to MPCs 1.1, 2.7, and 3.1. Alternative 4 may pose intermediate impacts to these populations due

increased demands for recreation. In all alternatives, the largest population occurs in MPC 4.5, which has already experienced loss of plants due to development.

***Dodecatheon dentatum* var. *utahense* (Utah Shooting Star, Wasatch Shooting Star)**
All alternatives would have moderate to high threats from recreation. In addition, there may be some moderate threats from weed invasion. Recreation impacts have already been documented as the primary threat to this species.

Botrychium lineare (Slender Moonwort)
As previously noted, the threats to the historic habitat on the Wasatch-Cache National Forest for this species have been minimized. Livestock grazing has not occurred at Silver Lake in the past several decades. Cattle were grazed around Silver Lake when the original Brighton Hotel was constructed in 1841 and expanded in 1898 (Murphy 1996). The collection of this species that is in the Garrett Herbarium was collected in 1905, about the time when this resort was likely to be very active. It is possible that the amount of use in the area, both by livestock and by people, negatively effected the population. Up until the early 1990's there were abundant user created trails in the meadows around Silver Lake and vehicle tracks were evident in the area. The construction of a raised boardwalk in the mid 1990's to protect the fragile wetland habitats from uncontrolled trampling also eliminated threats from road maintenance and development. Timber harvest occurred in the early 1900's to support mining activities in the area, but now is restricted to maintenance of ski runs at both Brighton and Solitude Ski Area adjacent to Silver Lake.

Cumulative Effects

Threatened, Endangered, and Proposed Species

Cumulative effects are defined as those impacts on the environment that result from the incremental effects of an action when it is added to past, present, and foreseeable future actions, regardless of the parties, government agencies or otherwise, responsible. The alternatives of the forest plan provide land and resource management direction for those lands within Wasatch-Cache National Forest that are administered by the Forest Service. Forest Service botanists and ecologist will continue to coordinate with American Indian tribes, other federal agencies, state and local agencies, university researchers, ICDC, and other resource advisory councils to further minimize or avoid adverse cumulative effects for all TES species, rare and unique communities, and potential habitat.

***Primula maguirei* (Maguire's Primrose)**
Currently, a total of 14 element occurrences of *P. maguirei* have been identified within a corridor of Logan Canyon approximately 19 km long and less than 1 km wide. The total global population of *P. maguirei* is estimated at 3000 individuals (USDI USFWS 1990). The narrow distribution and small population size of *P. maguirei* is likely best explained by its unique habitat requirements and need for calcareous substrates. It is more likely a relict species that formerly had wider ranges when climatic conditions in North America were wetter and cooler. Potential and actual habitat within the canyon and along the canyon floor may have been significantly impacted by human activity because of development (USDI USFWS 1990). Populations of *P. maguirei* are restricted to an elevational range of 1400 to 1800 meters (4,600 to 5,900 feet) along

the lower canyon walls of Logan Canyon (Padgett 1986) and plants are often found in cracks or crevices or amidst well-developed mats of moss and is most often found in areas of cool, moist microclimates. Extensive surveys of potentially suitable habitat (additional outcrops of Fish Haven and Laketown Dolomites) have been conducted in adjacent drainages and in other portions of the Bear River Range of northern Utah and southern Idaho. No additional populations of *P. maguirei* have been located (Franklin 1990c).

The US Fish and Wildlife Service prepared a Recovery Plan for *Primula maguirei* (USDI USFWS 1986) that has been in effect since 1990. Additionally, a Conservation Strategy for the Bear River Range Endemics, which includes *P. maguirei,* was prepared and signed in 1995 (Glisson 1995a). A progress report and amendment to the Conservation Strategy and Action Plan is currently in draft Form. This amendment will provide new information and proposed changes to the existing strategy and will enhance conservation and recovery efforts for *P. maguirei* and the other Bear River Range Endemics.

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid) -** *Spiranthes diluvialis* populations are randomly interspersed throughout relatively low-elevation riparian, vernally wet, and lakeside wetlands throughout the interior western United States. Known populations have been located on a variety of land ownerships including, Forest Service lands, BLM lands, and private ownership. Despite extensive surveys, no populations of this species have been discovered on the Wasatch-Cache National Forest. *Spiranthes diluvialis* prefers open, early seral riparian areas for establishment, thus restoration efforts for aquatic resources may be in direct conflict with management efforts for this threatened plant species. Additionally, activities that potential contribute to the cumulative effects for this threatened species include mining, timber harvest, livestock grazing, flood events, prescribed natural fire, reservoir level and river flow management, and road construction activities.

The USFWS has prepared a Draft Recovery Plan (USDI USFWS 1995a), which outlines the management actions and directives needed to restore populations and reduce current threats. The draft recovery plan outlines guidelines, objectives, and management directives. The intent of the draft and final recovery plan will be met and upheld for all Forest Service actions under all alternatives to ensure the continued viability of existing populations and to maintain potential habitat conditions. Efforts to streamline recovery actions with aquatic TEPS species conservation will be made to prevent conflicts in management activities and to most effectively preserve viability of all resources.

***Dodecatheon dentatum* var. *utahense* (Utah Shooting Star, Wasatch Shooting Star)**
Dodecatheon dentatum var. *utahense* is endemic to shady, moist cracks and crevices of rock outcrops, often in the spray of waterfalls (Holmgren 1994) and ranges in elevation from 2000 to 2900 m (6,400 to 9,500 feet). Four known populations have been identified in Big Cottonwood Canyon within an area of approximately 3 miles square (Welsh et al. 1993). Many surrounding seeps have been surveyed for the presence of *D. dentatum* var. *utahense*, though no new populations have been located.

Dodecatheon dentatum var. *utahense* is currently be considered for addition to the Region 4 Sensitive Species list for the Wasatch-Cache National Forest and is on the Utah Natural Heritage

Program Tracking list (UDWR 1998a). It currently has no designation or proposed legal protection with the US Fish and Wildlife Service. Currently, no preventative measures (i.e. fences, barriers) have been taken to exclude picnickers, hikers, or climbers from the fragile populations (Padgett 2000b). Future efforts to minimize long-term threats to the population viability will include measures to fence area to prevent further losses and interpretative measures to educate the public about the rarity of this species.

***Viola frank-smithii* (Frank Smith Violet)**
Viola frank-smithii is one of the few rock-dwelling violets known in North America (Holmgren 1992). Endemic to cliffs and near-vertical outcrops of carbonate rock, this species is found in elevation from 1646 to 2073 m (5,400 to 6,800 feet) with most populations occurring on cool, northerly exposures that are shaded for the majority of the day (Stone 1994). *Viola frank-smithii* is found in distinct microhabitats similar to that of *Primula maguirei* and these species are often found in close proximity (UDWR 1998b).

Conservation Strategy for the Bear River Range Endemics, which includes *Viola frank-smithii* was prepared and signed in 1995 (Glisson 1995a). Direct provisions for *V. frank-smithii* include the development and implementation of specific research aimed at determining habitat dynamics, germination requirements, and microhabitat characteristics. The completion of Conservation Agreements with US Fish and Wildlife Service and establishment of an interagency Technical Team to oversee implementation of the Conservation Strategy and Action Plan will further enhance recovery efforts for all the Bear River Range Endemics.

***Draba maguirei* var. *burkei* (Burke's Draba)**
Recent research has shown that variety *burkei* is a distinct species (Windam and Beilstein 1998) and will be elevated to the species level. A total of 13 populations are known, ranging from the Wellsville Mountains, Strawberry Peak, and James Peak. Burke's draba populations occur on ledges and in crevices of exposed carbonate and quartzite outcrops and on the adjacent rock loam soils in Douglas fir and mixed conifer communities. The elevation range for this taxon is 1650 to 2975 m (5,400 to 9,765 feet).

Draba maguirei var. *burkei* is currently a Sensitive species on the Region 4 Sensitive Species list for the Wasatch-Cache National Forest and is on the Utah Natural Heritage Program Tracking list (UDWR 1998a). It currently has no designation or proposed legal protection with the US Fish and Wildlife Service. Due to the existing threats to this taxon and its conservation needs, it was suggested by the Utah Native Plant Society (2000) that the status of *D. maguirei* var. *burkei* be elevated to Threatened with the US Fish and Wildlife Service. Forest Service ecologist, biologists, and managers are currently preparing a Conservation Assessment and Strategy for *Draba maguirei* var. *burkei*. Once completed, this Conservation Assessment and Strategy will provide management objectives that upon implementation will maintain the viability of populations, provide research opportunities to determine life history, demography, ecology, and factors contributing to rarity, and establish monitoring protocols for Burke's draba.

Botrychium lineare (Slender Moonwort)
Recent surveys and data review show that this species is possibly more widespread than previously known. It is currently known from a total of nine populations in Colorado, Oregon,

Montana, and Washington and, in addition, there are four historic population sites in California, Colorado, Idaho, and Montana and two in Canada. (USDI USFWS 2002a). It is believed that these historic populations may be extirpated. Cumulatively some of the recognized threats include road maintenance, herbicide spraying, recreation, timber harvest, trampling and grazing by wildlife and livestock, exotic species, and development. And because of its distribution and possible cumulative effects, it was noted in the Federal Register that:

> Because we concluded that the overall magnitude of threats to *B. lineare* throughout its range is moderate and the overall immediacy of these threats is nonimminent, we assigned this species a listing priority number of 11. Although we are not proposing a listing priority change or removal of candidate status at this time, any new information we receive on the distribution and threat/conservation actions of *B. lineare* may have a bearing on whether listing under the Endangered Species Act is still warranted.

Species at Risk

The current or proposed sensitive plants species inhabit a diverse array of habitat and vary in their distribution across the landscape. These species are faced with a variable range of threats and differ in the degree to which Forest Service management and other management may affect their status. The amount of current scientific information and distribution data available also varies greatly among species, thus often limiting the assessment of the cumulative effects of all management activities and environmental consequences on the long-term viability of such species.

Distribution on the Landscape

A large majority of the TES plant species or plant species at risk is locally or regionally endemic to the Wasatch-Cache National Forest and surrounding areas (Appendix F, Table F-1). Thus, the Wasatch-Cache is primarily responsible for a large majority of the populations of these species. Indeed, several species are found only the Wasatch-Cache National Forest lands (Appendix F, Table F-1). Management activities including livestock grazing, fire use, mechanical treatments such as timber harvest and road construction, recreation and noxious weed invasion may pose potential impacts to these species. The Forest Service endemic and local endemic species (Appendix F, Table F-1) have been identified for each specific Geographic Unit to further ensure that manage project level management and planning incorporate and protect these narrowly distributed species.

Trends

All TEPS species and their habitats could be potentially impacted, positively or negatively, by the activities of management agencies, private landowners, state agencies, and human impacts. However, several species may be more susceptible to these potential impacts (fire, grazing, recreation, mechanical treatments, noxious weed invasion, ski area activities) given their current population trend. For many of the sensitive species or species at risk, little to no current information is known concerning biology, threats, or population trends, thus making the estimation of cumulative effects difficult. Many are thought to have a declining population trends within the extent of their distribution.

These species would be at greater risk of loss or habitat destruction from the impacts of all management and human activities than those with stable or increasing trends. Efforts to increase information concerning trends, biology, and viability, and to preserve existing populations will be made for all TEPS species and plant species at risk.

Mitigation

Management efforts are already in place in an attempt to offset the cumulative effects that may occur under management activities. The National Forest Service (FSM 2670 and FSH 2609.25) Management Policy ensures that for all TEPS plant species, declining or otherwise, the following measures will be taken: (1) biological evaluations will be written for all activities that may impact sensitive species and their habitat, (2) “effects” of activities will be determined as similar to those for threatened, endangered or proposed species, and (3) sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. This National Forest Service Management Policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved. Additionally, guidelines for proactive management include preparation of Conservation Agreements and Strategies to maintain or restore habitats of sensitive species.

Topic 2 – Biodiversity and Viability

Wildlife

Introduction

The terrestrial wildlife resources in the Wasatch-Cache National Forest are as diverse as the plant communities, geologic features, and elevations in which they exist. Wildlife is dependent on all other resources that comprise and influence a species habitat. This is a complex resource since a land management activity may benefit some species or their habitat while harming other species.

Laws, Policy, and Direction

There are many laws that pertain to and regulate wildlife management within the National Forests. A full review of these laws can be found in, "The Principal Laws Relating to Forest Service Activities" (USDA Forest Service, 1993). Just a few of the important ones include:

Migratory Bird Treaty Act of July 3, 1918, (16 U.S.C. 703-712) controls the taking, killing, possessing, transportation, and importation of migratory birds.

Executive Order 13186, January 10, 2001. Responsibilities of Federal Agencies to Protect Migratory Birds.

Knutson-Vandenberg Act of June 9, 1930, (16 U.S.C. 576, 576a-576b) authorizes the use of funds collected from timber sales through this act to be used for, "protecting and improving the future productivity of the renewable resources of the forest land on such sale area, including sale area improvement operation, maintenance and construction, restoration and wildlife habitat management."

Bald and Golden Eagle Protection Act of June 8, 1940, (16 U.S.C. 688-668-d) provides protection to bald and golden eagles.

Sikes Act of September 16, 1960, (16 U.S.C. 670a) provides for carrying out wildlife and fish conservation programs on Federal lands including authority for cooperative State-Federal plans and authority to enter into agreements with States to collect fees to fund the programs identified in those plans.

Endangered Species Act of December 28, 1973, (87 Stat. 884 as amended; 16 U.S.C 1531, 1532, 1533, 1536, 1540) declares that "…all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

Wildlife policy and direction are outlined throughout Forest Service Manual 2600.

Affected Environment

General Overview

The Wasatch-Cache National Forest has about 300 vertebrate species of wildlife including approximately 30 fish, 6 amphibians, 18 reptiles, 74 mammals, and 190 birds (Appendix E). These species are spread across the forest using streams, lakes, ponds, barrens, and the diverse vegetative communities with their various age classes in elevations ranging from approximately 5,000 feet above sea level along portions of the Wasatch Front to 13,442 feet above sea level at Gilbert Peak in the Uinta Mountains. Some species are only on the Forest seasonally. Grizzly bear and wolves have been extirpated from the state. Other species such as the lynx and wolverine may occur at unknown levels. In recent times, non-native species such as the red fox and European starling have been added.

Past resource use and the exclusion of fire for almost 100 years has caused changes in some wildlife habitats. These changes have benefited some species and been detrimental to others. As discussed in the vegetation section of this document, defining and measuring the status of ecosystems now, as compared to their historic range of variability, is the foundation for sustainability of ecosystems. Areas that are within their historic range of variability are said to be in "properly functioning condition" (PFC). The vegetation features assessed to make this determination are: 1) Composition- the species list; 2) Structure- the layers and ages of species; 3) Patterns- the patchwork of species and ages across the landscape; and 4) Functions- processes and how they occur and interact on the land. These features are very much related to the quality and quantity of wildlife habitats.

With 300 plus species on the Forest it is impossible to track them all so certain groups are carried forward through planning documents. Big game is carried forward due to the great interest of the public both for hunting and wildlife viewing. Landbirds are of interest not only for wildlife viewing but also because of the international interest in conservation and the protection afforded them through the Migratory Bird Treaty Act and Executive order 13186. Endangered and threatened species are considered because of the requirements of the Endangered Species Act. Species-at-risk, species for which viability may be a concern, are discussed in detail in Appendix B2 and summarized in this chapter. These species are used to help insure continued viability and diversity of species as required in NFMA and 36 CFR 219.19 and 219.26. Management indicator species are required under 36 CFR 219.19. With these species groups it is felt that the Forest can account for the diversity and viability of all species that may be present on the Forest.

Big Game Populations

Changes in big game species composition have occurred in recent decades. **Mule deer** have declined from higher population levels in the 1960's. On the 8 hunting units that contain National Forest System lands administered by the Wasatch-Cache National Forest, deer numbers are currently at or below herd objectives set by the Utah Division of

Wildlife Resources (UDWR, 2002). **Elk** have been aggressively managed by the UDWR in recent decades through transplants and population numbers are increasing on most of the 8 hunting units. Elk are at or above herd objectives on these units (UDWR, 2002). **Moose** have become well established through immigration into the state and through transplants. In some areas numbers are at such levels they have been used as transplant stock to other areas within and outside the state. These areas include the Ogden Valley where land ownership is shared by private, state, and the Forest Service, and some drainages on the North Slope of the Uinta Mountains**. Rocky Mountain bighorn sheep** were reintroduced to the Hole in the Rock area of the Uinta Mountains in 1989. With corresponding reintroductions to the east on the Ashley National Forest, the herd now supports a very limited hunt of 1-2 permits a year. The herd is well below the numbers that habitat is capable of supporting and many areas with suitable habitat remain unoccupied. **Mountain goats** were introduced to the Wasatch Front (Salt Lake County and Utah County on the Uinta NF) in the 1960's, Bald Mountain on the Kamas Ranger District in the 1980's, and Willard Peak on the Ogden District in the 1990's.

Population objectives, harvest levels, and species management are established in herd unit management plans for all of the above big game species by the UDWR. For deer and elk these objectives are:

DEER

This information on Deer herd objectives and postseason surveys in Tables WL-1 and WL2 is from the "2002 Utah Big Game Proclamation, Bucks, Bulls and Once-in-a-Lifetime" pages 60-61.

Table WL-1. Herd Objectives

Unit Name/ Number	Plan Objective	Estimated Winter Population 01/02	Bucks/ 100 Does Postseason	% Bucks >3 points Postseason
2 - Cache	25,000	18,400	15	30
3 - Ogden	12,000	9,400	15	30
4 - Morgan, S. Rich	12,500	10,100	20	30
5 - East Canyon	8,500	8,600	15	30
6 - Chalk Creek	11,500	11,800	15	30
7 - Kamas	9,000	6,800	15	30
8 - North Slope	5,300	4,500	15	30
17 - Wasatch Mts.	40,800	32,200	15	30
18 – Oquirrh Stansbury	10,600	10,800	15	30

Table WL-2. Postseason Surveys

	Bucks/100 Does				Bucks Greater Than 3 Point			
Unit Name/ Number	97-98	98-99	99-00	00-01	97-98	98-99	99-00	00-01
2 – Cache	12	11	11	16	39	50	38	32
3 – Ogden	7	12	11	19	47	44	27	39
4 – Morgan, S. Rich	10	44	24	31	26	40	56	52
5 – East Canyon	18	14	14	18	50	40	56	38
6 – Chalk Creek	12	22	22	25	40	53	53	51
7 – Kamas	7	12	13	21	40	43	42	48
8 – North Slope	9	19	14	18	29	54	46	36
17 – Wasatch Mts.	10	16	13	19	32	37	37	40
18 – Oquirrh Stansbury	15	9	11	17	25	25	25	29

Elk

Table WL-3. Elk herd objectives are from Elk Herd Management Plans prepared by the UDWR. April 1998.

Herd # and Name	Target Herd Size Winter	Estimated Population Winter 2000-01	Post Season Bull to Cow Ratio	Post Season Bulls 2 ½ Years Or Older
2. Cache	2,300	2,100	8:100	50%
3. Ogden	1,200	700	8:100	50%
4. Morgan-South Rich	3,500	3,500	40:100	50%
5. East Canyon Davis/S.L. County Morgan/Summit County	 250 200	600[3]	8:100	50%
6. Chalk Creek	1,900	2,400	8:100	50%
7. Kamas	650	650	8:100	50%
8. North Slope Summit/West Daggett Three Corners	 1,600 500	1,260[3]	8:100	50%
17. Wasatch Mts.	5,050 200[1]	5,010[3]	8:100	50%
18. Oquirrh Stansbury	800 250[2]	680[3]	30:100	66%

[1] Wasatch-Cache NF portion (Salt Lake County)
[2] Stansbury portion is new and not yet hunted. 250 is a target population for the Stansbury portion approved the the Wildlife Board July 9, 1997.
[3] Total Unit. Breakdown by County or sub-unit not available.

Table WL-4. Approximate Acreage of Deer and Elk Herd Units On the Wasatch-Cache National Forest. Acreages come from deer and elk herd management plans that are dated April 1998.

Unit # and Name	Area on Forest Summer Range	% of Total Summer Range	Area on Forest Winter Range	% of Total Winter Range
DEER				
2. Cache	228,454	52%	52,258	18%
3. Ogden	44,991	19%	20,007	13%
4. Morgan-S. Rich	37,070	10%	3,251	2%
5. East Canyon	42,642	22%	21,842	13%
6. Chalk Creek	34,439	11%	91	0%
7. Kamas	126,402	60%	6,508	28%
8. North Slope [1]	484,155	85%	84,015	44%
17. Wasatch Mts [2]	638,060	59%	126,091	21%
18. Oquirrh Stansbury	54,664	27%	13,650	6%
ELK				
2. Cache	232,746	54%	97,108	28%
3. Ogden	17,554	13%	18,923	11%
4. Morgan-S. Rich	20,993	6%	16,295	6%
5. East Canyon	5,646	24%	11,545	34%
6. Chalk Creek	34,439	12%	91	0.5%
7. Kamas	126,402	66%	9,964	41%
8. North Slope	456,996	86%	93,008	49%
17. Wasatch Mts [2, 3]	485,340	63%	222,861	27%
18.Oquirrh Stansbury [4]				

[1] This unit shows 366 acres (9%) in yearlong range.
[2] This Unit contains National Forest System lands administered by the Wasatch-Cache, Uinta, and Ashley National Forests. Acreages are not broken out by individual Forest.
[3] Unit Management Plan also lists 2,356 acres (22%) as Yearlong Range on National Forest System lands. As in ** above, this is not broken out by National Forest.
[4]Since the Stansbury portion of the unit is new the Unit Management Plan does not yet break out seasonal ranges for the National Forest Portion of the unit.

Big Game Winter Range

Potential forage competition may occur among many species on winter ranges. These are comprised primarily of mountain brush community types including species such as Gambel oak, sagebrush, serviceberry, mountain mahogany, and bitterbrush. Most critical winter range occurs outside the Forest, though the reduction in availability due to development has placed a higher value on the limited national forest winter range.

Winter range has been impacted through urban expansion along the Wasatch front. This has involved a loss of habitat through development, and a reduction in the quality of habitat through the introduction of non-native grasses, forbs, and noxious weeds. In addition, fire cycles for these areas have been altered due to the larger composition of annual species that readily burn, and the high number of human caused ignitions. The proximity of winter range to urban populations and domestic livestock also poses a potential disease transmission risk, and animal harassment from people is of concern.

Winter range on the North Slope is mostly north of the forest boundary. The challenges of urban interface are not present, but conflicts with private ranchlands and competition with domestic livestock for spring forage are a problem in some areas. Summer range conditions are not the limiting factor for big game populations.

There are 152 winter range trend study sites monitored by the UDWR with Forest Service assistance. Of these 69 are on or near National Forest System lands. General conditions of each of the sites and their relative value are difficult to summarize, however each site is described through general trends in soil, browse, herbaceous understory, and browse utilization. Sites on or near the Forest were evaluated last in 1998 (UDWR, 1998c).

Landbirds

Significant concern for bird species' status was emphasized in the Executive Order of January 10, 2001, which provides direction for more consideration through the NEPA process in forest and project planning. It found migratory birds to be of great ecological and economical value to this country and other countries (Clinton, 2001).

In order to monitor migratory and resident birds, the Forest Service initiated monitoring in 1996 by establishing transects across the forest that correspond to national protocol. Baseline data for each transect is being gathered as budgets and personnel levels allow. Monitoring of birds is more beneficial for regional scale information, but can be applicable to detecting some local trends (Canterbury et al. 2000). Each transect is two miles in length, and consists of 10 point counts along the route. Vegetation is inventoried at each point, and transects occur throughout all vegetation community types. Surveys are repeated every five years.

In addition to the migratory birds transects, there are six Breeding Bird Survey routes that occur on or adjacent to the forest that are monitored annually through the national protocol administered by the U.S. Geologic Survey (USGS) to help indicate trends for these species. USGS specifies in their data base that variances derived from individual transects may be invalid so the Forest has used data on a statewide basis to track the status of migratory birds that were used as management indicator species in the 1994 plan.
HawkWatch International has survey sites for migrating raptors on the north end of the Wellsville Range, on the forest, and in the Goshute range just into Nevada. These monitoring sites provide information on range-wide trends for raptors.

Project specific surveys for species at risk also provide distribution information on other species.

Forest Service transects have not been in place long enough to determine trends. At this time, it is assumed that the trends would follow national trends that show some increases and some decreases in individual species. Raptor work by HawkWatch International, which dates back to 1977, indicates the same (Vekasy, 2001). Peregrine falcons have increased, while goshawks appear to be stable over time but decreasing since 1996.

Upland game such as ruffed grouse and blue grouse may have increased, while sage grouse and sharp-tailed grouse have decreased from historic levels. Introductions of turkey have taken place in the past several years with great success and there are turkeys in several areas of the Forest.

Endangered, Threatened, and Sensitive Species

The Utah Field Office of the U.S. Fish and Wildlife Service (FWS 2002b) puts out a list twice of, "Federally Listed and Proposed (P) Endangered (E), Threatened (T) and Candidate (C) Species and Habitat In Utah By County." The following terrestrial species are listed in their document dated August 2002 as occurring or having habitat in counties containing portions of the Wasatch-Cache National Forest. There have been no changes in this list since January.

Bald eagle	*Haliaeetus leucocephalus*	T
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C
Mountain Plover	*Charadrius montanus*	PT
Canada lynx	*Lynx canadensis*	T
Black-footed ferret	*Mustela nigripes*	E
Ogden Rocky Mountainsnail	*Oreohelix peripherica wasatensis*	C
Fat-whorled pondsnail	*Stagnicola bonnevillensis*	C

The following is a summary of the species status. A more detailed evaluation is included in the Biological Assessment provided to the FWS.

Bald eagle. Where the bald eagle is mainly a winter visitant to Utah it does nest in Salt Lake and Davis Counties at lower elevations in the wetlands around the Great Salt Lake. It is occasionally seen on Forest but its main foraging and roost areas are at the lower elevations where there is abundant prey. There is one large roost area in a secluded area of Box Elder County.

Western yellow-billed cuckoo. The cuckoo is a low elevation riparian shrub inhabitant. Historically it has been observed close to the Forest along the Wasatch Front and in Cache Valley. The UDWR Natural Heritage Program indicates that the species is an historical breeder in the state.

Mountain plover. This plover is a short grass prairie species. It is listed in Duchesne County in Utah and would occur at low elevations off the Forest. It is also listed in Wyoming in Uinta County. There is some habitat for the species close to or on lower elevations of the Forest.

Canada lynx. Historically lynx have been found in Utah in very low numbers. Between 1916 and 1991 there are 27 referenced occurrences with 10 being verified (Ruggiero et.al. 2000). Most are from the Uinta Mountains with others scattered in other locations including Summit (2 specimens) and Cache (one specimen) Counties. There have been no verified records since 1991.

The Canada lynx was proposed for listing as a threatened species under the Endangered Species Act on July 8, 1998 (Federal Register Volume 63, No. 130). The final rule listing the contiguous Untied States District Population Segment (DPS) was published on March 24, 2000 (Federal Register Volume 65, No. 58). In the final rule it was concluded that the threat to the lynx was the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in forest plans and BLM land use plans. It stated that this lack of guidance could allow or direct actions that cumulatively adversely affect the lynx.

The listing included the historic range of the lynx, which includes Utah, and the review by the US Fish and Wildlife Service (FWS) listed 11 counties in Utah as being included in the listing where suitable habitat existed. Counties where National Forest System lands occur that are administered by the Wasatch-Cache National Forest include: Cache, Rich, Summit, Morgan, Weber, Duchesne, and Salt Lake. During the summer of 2000 the three National Forests in northern Utah conducted a review of all ongoing projects on the forest to fulfill consultation requirements with the FWS. In a letter dated August 15, 2000 the FWS concurred with the Wasatch-Cache determination that activities on the Forest would have no affect or may affect but would not likely adversely affect the lynx. The concurrence was based on the evaluation that determined the projects complied with the Canada Lynx Conservation Assessment and Strategy (LCAS) (First Edition was pre August 2000, Second Edition, August 2000 – Ruediger,2000).

In addition to the listing, consultation on ongoing projects, and the publishing of the LCAS, the Forest Service entered into the “Canada Lynx Conservation Agreement” (CA) with the FWS on March 1, 2000. The purpose of the agreement was to promote the conservation of the Canada lynx and its habitat on federal lands managed by the signatories. In accordance with the CA the Wasatch-Cache will manage lynx and lynx habitat consistent with the LCAS and lynx Science Report. Some standards and guidelines from the LCAS will be adopted as itemized standards and guidelines for this Forest Plan. Other LCAS standards and guidelines will not necessarily be itemized in the plan because they will be covered by other management and planning direction or will be evaluated at the project level in coordination with the Fish and Wildlife Service. However, the Plan conclusively adopts the entire CA and LCAS wherever applicable to Forest planning processes.

During this same period the three forests also mapped lynx habitat with maps showing habitat, and non- habitat. With these maps lynx analysis units (LAUs) were identified by biologists from the three forests, FWS, and the Utah Division of Wildlife Resources (UDWR).

The second edition of the LCAS was published in August 2000 (Ruediger et.al. 2000). In it, the habitat definition was refined and using this information the three forests in northern Utah refined their definition that now includes primary, secondary, and non-habitat. A new map was printed using this definition in August 2002. Meetings were again held between the forests, FWS, UDWR, and BLM to review and refine the LAUs. In a letter from the FWS dated November 6, 2002 they concurred with the proposal to eliminate LAUs in the Bear River Range on the Wasatch-Cache and reclassify the area as linkage habitat. The only core habitat in Utah is in the Uinta Mountains.

As directed in the LCAS, the three forests in Utah have conducted hair snare survey transects in an effort to determine if lynx are present in the State. There were two transects on the Uinta Mountains (one on the Ashley, one on the Wasatch-Cache), one on the Uinta National Forest, and one in the Bear River Range on the Wasatch-Cache. There was also one on the Manti-LaSal National Forest in an area where there was a historic taking of the lynx. These transects followed a national protocol. They were run for three years (1999, 2000,2001) and all samples were analyzed at the same lab. In the three year period no lynx were detected. Brigham Young University is also running transects in the Uinta Mountains in conjunction with a forest carnivore study they doing. Their third year will be in 2002. The fact that no lynx have been detected does not mean they are not present but the probability is very low.

Black-footed ferret. The ferret is closely connected to prairie dog towns. Any prairie dogs on the Forest would be at the lowest elevations right along the Forest boundary in Summit and Rich Counties. The FWS lists these counties as historical range. Since the UDWR and FWS reintroduced the species to the Uintah Basin they have classed it as S1. Before the reintroduction it was classified as historical.

Ogden Rocky Mountain Snail. One population of this species is known from the mouth of Ogden Canyon. Collections in areas of other subspecies have been collected along with this one and DNA testing is being conducted to see how different the subspecies are. The area where this species is located on Forest is an area of very limited activity. Local staff are aware of the species and efforts are being made to prevent impacts.

Fat-whorled pondsnail. This pondsnail is a low elevation species toward the west desert in Box Elder County. The abrupt rise of the Wasatch Range in Box Elder and Weber Counties make it very unlikely that the species exist on Forest. It occupies small spring-fed, well-vegetated, ponds, although the presence of this species in Lake Bonneville deposits suggests that it previously lived in a large lake. Shells are widespread in the Bonneville Basin, however live specimens have only been found near Corinne in Box Elder County. This is well off the forest and the nearest habitat for this species on forest

would be in Cache County, which is outside the range of the species. This species will not be addressed further in this document (UDWR 1998a).

Sensitive species are those species identified by the Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in numbers or density, or a significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution. On the Wasatch-Cache the Regional Forester has designated the following terrestrial species as sensitive:

Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Plecotus townsendii*
Wolverine	*Gulo gulo*
Boreal owl	*Aegolius funereus*
Flammulated owl	*Otus flammeolus*
Great gray owl	*Strix nevulosa*
Northern goshawk	*Accipiter gentiles*
Peregrine falcon	*Falco peregrinus*
Northern three-toed woodpecker	*Picoides tridactytus*
Columbian sharp-tailed grouse	*Tympauchus phasianellus columbianus*
Spotted frog	*Rana luteiventris*

The following is a summary of the status of these species on the Forest. More detail is contained the Biological Evaluation written for this plan.

Spotted bat. Historically the spotted bat has not been documented on the Wasatch-Cache National Forest. In northern Utah the only historical record found by the Utah Natural Heritage Program is a female collected off of a school in Salt Lake City in 1934. Its normal habitat is arid country relegating it mostly to lower elevations on the Forest.

Townsend's big-eared bat. This bat is known from seven locations on the Logan, Ogden, and Salt Lake Ranger Districts. It is associated with caves and mines that it uses for nursery colonies and hibernacula.

Wolverine. Historically the wolverine was found throughout the Wasatch-Cache National Forest. There has not been a confirmed sighting for at least ten years. In the early 1990s one was reported on the Logan Ranger District. Cameras placed over bait were unsuccessful in documenting presence. Wolverine prefer mature and old growth forest but do forage in meadows and talus slopes.

Boreal owl. Utah is the southern edge of the boreal owls range. The species occurs in very small numbers. It has been found in 2-3 locations on the Forest.

Flammulated owl. Flammulated owls are more common in the state then boreal owls but they are still rare. They have not been documented on the Uinta Mountains but have in several locations on the Bear River and Wasatch Ranges.

Great gray owl. The great gray owl is considered a winter vagrant in Utah with one observation recorded by the Utah Natural Heritage Program on the Uinta National Forest.

Goshawk. In 1991, the goshawk was designated as a sensitive species in the Intermountain Region of the Forest Service. As a result of this designation, special management is emphasized to ensure the goshawks viability (FSM 2670). In March of 1997 the Utah Division of Wildlife Resources classified the goshawk as a state sensitive species. The purpose of this designation was to identify species in the State that are most vulnerable to population declines or habitat loss and to stimulate management actions for the conservation of this species.

To address the issue of declining goshawk habitat in Utah, a technical team was assembled. They developed seven questions and attempted to answer them in, "The Northern Goshawk in Utah: Habitat Assessment and Recommendations" (Graham et.al. 1999). The seven questions and a summary of the findings follow, as quoted from the repot:

1. Is there adequate nesting habitat available?
   Presently there appears to be adequate nesting habitat in the State and on the Wasatch-Cache National Forest to maintain a breeding population of goshawk.
2. Is there adequate foraging habitat available?
   Based on habitat features important to selected prey used by goshawks, it appears that foraging habitat is presently available throughout the State and on the Wasatch-Cache.
3. Are northern goshawks able to move freely between habitat patches?
   Goshawks appear to be able to move freely among habitat patches throughout Utah and the Forest (it is noted that satellite tracked birds captured on the Wasatch-Cache have wintered south of Delta, Utah and along the Utah/Arizona border).
4. Is the population viable at the State level?
   This assessment could not answer the question of population viability directly because there are inadequate demographic data available. Most of the currently forested lands were rated as medium or high value for both nesting and foraging habitat. Where surveys have been conducted, goshawks are present and nesting successfully. Furthermore, all available habitat patches are connected, and no known population is isolated. In general, existing habitat appears to be capable of supporting a viable population of goshawks at the State and Forest spatial scales.
5. Where is the high value habitat?
   High value habitat is distributed throughout the State, with 60% controlled by the USDA Forest Service.

6. How are current management policies affecting goshawks?

   Current management policies are affecting northern goshawks in a variety of ways. On National Forest Service administered lands in Utah, 20% of the high value habitat is being managed with a timber emphasis, 35% with mixed uses, and 27% with a range emphasis. Each of these management categories allows for activities that either can degrade or improve goshawk habitat. The information in this assessment does not reveal any substantial deficiencies in habitat quality in any management category.

7. What are the important habitat trends and their implications for goshawks?

   The most obvious trend in Utah forests and woodlands is the lack of early and mid-seral species in all of the potential vegetation types. If forest management stresses properly functioning condition, importance of large trees, maintaining native processes, using adaptive management, and recognizing the role of fires, the habitat outlook could be favorable for the goshawk and its prey. This is true on the Wasatch-Cache National Forest also.

   Urbanization and more intensive uses of the forest by humans could degrade goshawk habitat, especially on private lands. Private lands in Utah will continue to be developed, making the lands administered by Federal entities increasingly important for goshawks. This trend could also affect the connectivity of the habitat across the State.

The situation on the goshawk on the Wasatch-Cache National Forest fits the discussion above. They are found on all Districts on the Forest.

To formalize the recommendations made in the above assessment the six National Forests in Utah amended all Forest Plans in March 2000. The amendment was to cover the period from March 2000 until individual forests revised their forest plans over the next several years.

Peregrine falcon. Peregrine falcons are tied to high cliffs or buildings for nesting in areas where there are abundant avian species for prey. Historically for the Wasatch-Cache this was along the Wasatch Front. The best habitats on National Forest System lands are located in Salt Lake, Box Elder, and portions of Weber Counties. There are known nesting pairs in Box Elder County.

Northern three-toed woodpecker. This species is found in conifer and aspen vegetation types throughout the Wasatch-Cache and Utah. It may presently be at some of its highest population levels on the Forest with the amounts of mature and old growth forests exist.

Columbian sharp-tailed grouse. The range of the sharp-tailed in Utah is in Box Elder, Weber, and Cache Counties. It is a sagebrush/grassland species that would be found at the lower elevations of the Forest.

Spotted frog. The spotted frog is covered under the Aquatic Section of this document.

A forest plan is a programmatic document that sets the framework for future work on the Forest. With the outputs identified in the plan viability and persistence, over time, of the terrestrial TES species the Forest is responsible for protecting, will not be compromised. As individual site-specific projects are proposed in the future a biological assessment/evaluation will be written to determine the effects of that project.

Species-At-Risk (SAR)

Species-at-risk are defined as, "Federally listed endangered, threatened, candidate, and proposed species and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk may include sensitive species and state listed species. A species-at-risk also may be selected as a focal species."
For the Wasatch-Cache Plan revision, the term "species-at-risk" includes:

-Fish and Wildlife Service endangered, threatened, candidate, proposed species.
-Regional Forester designated sensitive species.

Also considered for inclusion as species-at-risk were species identified by:
-The Nature Conservancy as G1, G2, and G3.
-State Natural Heritage programs as S1, and S2
-Partners in Flight species of concern.
-The Forest that do not appear on any other lists.

The SAR list is dynamic and species will be added as deemed necessary or removed as recovery occurs or new information indicates they are not at risk.

By the above definition the Forest has identified 33 terrestrial vertebrate species as SAR. This includes 3 reptiles, 21 birds, and 9 mammals. By the above definition 4 of these species are Federally listed, candidate or proposed, 8 are Forest Service sensitive, 17 are listed as S –1 or 2 by the state, and 4 are concerns of Partners in Flight. These species are discussed in detail in Appendix B-2.

These 33 species were then divided into fine and coarse filter categories. Fine filter species are those for which conservation strategies or recovery plans are available with specific guidelines or recommendations are listed. Coarse filter species were grouped by the vegetation type they use. Management direction centers on the management of the vegetation type in a properly functioning condition within the historic range of variation.

Mollusks

There are a number of mollusks on the Forest as evidence by historic records. In recent years the Forest has started to do some additional surveying for these species. Some of these mollusks are dry land species while other are aquatic or semi-aquatic in nature.

We will continue to collect additional information on these species and provide habitat and species protection as risks and threats are identified. Insufficient information is available to analyze the effects of implementing the Forest Plan on these species.

Management Indicator Species/Management Indicator Communities

Management indicators (Table WL-5) are used to assess the effects of a management activity on wildlife. The general guidance and criteria for selecting management MIS are contained in 36CFR219.19(a) and in the Forest Service Manual 2621.1. The following criteria were used in selecting management indicator species (MIS):

1. MIS must have a strong (but not exclusive) affinity for the habitat type.
2. The habitat type is key habitat in the life cycle of the MIS
3. The MIS is sensitive to change.
4. The MIS is relatively easy to monitor, i.e., high visibility and in adequate numbers.
5. The MIS is somewhat representative of all species that use the habitat type.
6. The MIS is, for the most part, a year round resident on the forest.

The 1985 Forest Plan includes two categories in the MIS discussion. These are Ecological Indicators that are intended to show the effects of management on the ecosystem, and High Interest Species that identify species of economic importance (such as big game) and species of concern (such as Federally listed species, Forest Service sensitive species and other species at risk). The 1985 Plan includes 14 Ecological Indicators to monitor 13 vegetation types, rivers and lakes. There are eight High Interest Species, including 3 big game animals, 2 fish species, and 3 species of concern.

Table WL-5. Management Indicator Species/Management Indicator Communities

MANAGEMENT INDICATOR	ASSOCIATED VEGETATIVE COMMUNITY
Goshawk *Accipiter gentilis*	Aspen, Conifer, Mixed Conifer
Snowshoe Hare *Lepus americanus*	Pole/Sapling Aspen, Conifer, and Mixed Conifer
Beaver *Castor canadensis*	Riparian
Cutthroat trout Oncorhynchus clarki pleuriticus Oncorhynchus clarki utah	Aquatic

Updating MIS was recommended in the Preliminary Analysis of the Management Situation (USDA Forest Service 1999a). The Preliminary Analysis of the Management Situation proposed to use neo-tropical migratory birds for MIS. Upon further consideration and in discussions with the Regional Office it was determined that neo-tropical migratory birds would not be used because of criteria six and the fact that they are not, for the most part, year round residents of the forest.

The Preliminary Analysis of the Management Situation also recommended vegetative indicators because vegetative changes will show up faster than detectable population changes in a faunal species. Vegetative indicators will not be used but will be monitored in connection with Properly Functioning Condition of vegetative types.

Discussion of Individual Management Indicators

Goshawk – aspen, conifer, and mixed conifer. The goshawk is a forest habitat generalist that uses a wide variety of forest ages, structural conditions, and successional stages. The goshawk preys on large-to-medium-sized birds and mammals, which it captures on the ground, in trees, or in the air. Three components of a goshawk's home range have been identified: nest area (approximately 30 acres), post fledging-family area (approximately 420 acres), and foraging area (approximately 5,400 acres). The species nest in a wide variety of forest types including aspen, coniferous, and mixed conifer forests. It typically nests in mature and old growth forests (Nature Conservancy 1999).
Snowshoe hare -- pole/sapling aspen, conifer, and mixed conifer. In the Rockies and westward, hares mainly use coniferous forests. They are predominately associated with forests that have a well-developed understory that provides protection from predation and supplies them with food. Such habitat structure is common in early seral stages but may also occur in coniferous forests with mature but relatively open overstories. (Ruggiero 2000)

Beaver – riparian. The beaver occurs throughout most of North America and is fairly common in Utah. It is found in permanent slow moving streams, ponds, small lakes, and reservoirs. On the Wasatch-Cache National Forest, the Uinta Mountains are classed as “substantial value” habitat and the rest of the Forest as “critical value” or “high value habitat as indicated on Gap Analysis maps.

Bonneville and Colorado River cutthroat trout – aquatic. The number of fish in a reach of stream is not considered a good monitoring factor because some streams are stocked and most streams are fished. Number fluctuations due to stocking and angling make it difficult, at best, to determine the effects of forest management activities on the population. Cutthroat trout (Bonneville or Colorado River, depending on the drainage) will be used as MIS using a “condition” factor as the monitoring tool (see monitoring below).

Vegetation types not monitored by MIS
There are two vegetation types not covered by MIS. The first is the sage/grasslands of which there are 189,600 acres across the Forest. The species which best fit the criteria for sage/grasslands is the sage grouse (*Centrocercus urophasianus*). Since the sage grouse is not spread across the Forest in a manner that it will be able to indicate the effects of management in the sage/grasslands across the Forest it was determined not to fit the criteria in a manner to be acceptable as an MIS. With proposed projects in used habitat the species can be used on a project to monitor the effects of the individual project. This would be determined in a site- specific NEPA document. The

sage/grassland vegetation type will be monitored to track changes in amounts and age classes, as age classes are mapped.

The other vegetation type not covered is oak/maple (mapped separately in the GIS layer with oak covering 90,800 acres and maple covering 14,600 acres). Work in the oak/maple is planned in the form of fuels reduction along the urban interface. This is planned to be mechanical and would serve to give better age class diversity in the type. As with the sage/grassland, oak/maple will be monitored as to assess changes in amounts and age classes, as age classes are mapped.

A complete discussion on MIS and their habitats is contained in Appendix J.

Wildlife Related Recreation
Besides hunting, in the past 10-15 years public interest and participation in non-consumptive recreation, such as wildlife viewing and photography, has greatly increased. With the urban expansion along the Wasatch Front, the Forest has become a favored of population growth in the state. Legislated caps on the number of some big game recreation destination for people. Fishing and hunting have increased, but not at the rate hunting permits have effectively leveled off participation for deer and elk hunting.

Environmental Consequences

General Effects

In evaluating effects of alternatives on terrestrial wildlife species, it must be remembered that any potential activity may be detrimental to some species while it benefits others because of the wide variety of habitat needs. By managing to achieve properly functioning conditions within the historic range of variability, it is assumed terrestrial wildlife species will reach an equilibrium with habitat and will move and adjust as structure and age class composition of vegetation progresses toward potential or is set back to an earlier seral stage.

The primary determinant for evaluating management activities effects on species is the effects of those activities on vegetation communities relative to properly functioning condition (PFC). The effects analyzed in the Vegetation section of this chapter are the basis for much of the effects disclosed for wildlife.

The Management Prescription that, when considered with other management direction such as standards and guidelines, provides the most protection for terrestrial wildlife, along with the ability to improve habitat, is Prescription 3.2 (Terrestrial Habitat Emphasis). Alternative 7 splits 3.2 into 3.2U that consists of those terrestrial habitat areas protected from development because of potential impacts to key habitat elements, and 3.2D that consists of those terrestrial habitat areas where development is allowed for the purpose of maintaining, improving or restoring key habitat elements. For comparison purposes 3.2U and 3.2D have been combined.

There are approximately 309,000 acres of designated wilderness on the Forest (Management Prescriptions 1.1 – 1.4). Within these prescriptions terrestrial wildlife habitat would potentially be protected, but very little or no direct habitat improvement, or other project work would be accomplished. Man caused fragmentation would be at a minimum. The forested lands will remain forested and continue progressing to the mature and old age classes until set back by wildland fire, insects, or disease. Terrestrial wildlife species that prefer the older age classes, such as woodpeckers, will do better in this situation, while those that prefer younger age classes would likely not have abundant habitat.

Wilderness acreages have the potential to change through recommended wilderness acres identified as Prescription 1.5. This will increase the number of acres where potential effects described for designated wilderness apply.

Table WL-6 shows the acreages under Prescriptions 3.2 and 1.5 that have added wildlife management emphasis and protection by alternative.

Table WL-6 Acres of Protective Prescription by Alternative

Management Prescription	Acres by Alternative						
	1	2	3	4	5	6	7
3.2	86,800	138,200	201,600	11,500	24,600	218,300	0
3.2d	0	0	0	0	0	0	85,000
3.2u	0	0	0	0	0	0	122,300
1.5	388,900	145,900	51,500	0	0	69,400	61,400

The potential effects of other management prescriptions on wildlife vary. Emphasis on timber production and grazing, both of which can cause changes in age class, and structure will benefit some species that depend on younger age classes and more open structure such as vesper sparrow and snowshoe hares, while being detrimental to others that need older age classes and a more closed structure such as Brewer's sparrow and goshawk. Fragmentation of continuous forested cover and displacement from activity disturbances that can be caused by all resource activities also affect different species differently. These are discussed below. Standards and guidelines set parameters that mitigate or lessen total impacts for all alternatives. Also, it is assumed that managing for the historic range of variation with properly functioning conditions is the most reliable way to ensure a mix of habitats conducive over time to sustained biodiversity and species viability.

Effects on Terrestrial Wildlife from Roads/Access Management

Potential impacts from roads and trails come from fragmentation of habitat and displacement of wildlife. The amount of displacement on a road or trail is a function of the amount of use on the road or trail and the species of wildlife. Some species are more sensitive to disturbance than other species. Impacts of present roads and trails are the same across all alternatives. Present road densities range from 0.4 miles of road per square mile of habitat in the Stansbury Management Area to 1.4 miles of road per square

mile of habitat in the Bear Management Area (see Table RM-1 under Topic 3 of this Chapter). As noted in Table RM-1, the total miles do not include private, county, state, or other Federal roads that total 166 miles across the entire Forest. Additional impacts come from new road or trail development. For roads, the increase over the next 10 years from timber harvest and oil and gas exploration and development are displayed in Table WL-7. Trail development is assumed to be similar for all alternatives.

Table WL-7 Miles of Projected New Road Construction by Alternative Over 10 Years

Activity	Alternatives						
	1	2	3	4	5	6	7
Projected New Timber Harvest Roads (miles)	0	6	39	49	49	6	7
Projected New Oil and Gas Exploration Roads (miles)	3	3	6	0	10-11	6	7.5
Projected New Oil and Gas Development Roads (miles)	0	0	4	0	4	4	4
Projected New Roads over 10 years	3	9	49	49	64	16	18.5

Since the Revised Plan and FEIS are programmatic documents it is not known where the needed roads will be located. For Timber harvest they will be on the Uinta Mountains or the Bear River Range (Kamas, Evanston, Mt. View, Ogden or Logan Ranger Districts). For the most part the timber roads will be located on big game summer range and may displace big game and reduce habitat effectiveness while in use. Roads constructed for oil and gas exploration and development will all be on the Uinta Mountains and could be located on either summer or winter range. New road construction would have minimal effects on landbirds. New roads will cause more fragmentation of habitat that could affect lynx and wolverine, if they should be present, especially if they remain open to snowmobiling in the winter. Effects on other TES species would be very low. Effects on MIS would also be very low, the effects being felt on the project areas that the roads access.

Motorized recreation in winter can have adverse affects on wildlife caused by the use of valuable energy expended while trying to avoid the disturbance, especially on big game winter ranges. The amount of big game winter range open to winter motorized travel is identified in Table WL-8.

Table WL-8. Winter Recreation Use on Big Game Winter Range

Use	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	EC[1]
Motorized	22,400	22,600	108,600	141,700	115,700	78,600	54,500	96,100
NA	0	0	0	15,400[2]	0	0	0	0
Non Motorized	185,000	184,400	98,900	52,200	91,700	128,900	152,900	111,200
Wilderness	37,800	37,800	37,800	36,200	37,800	37,800	37,800	37,800

[1] EC = Existing Condition
[2]NA = Not Analized (land was transferred into National Forest System after 1985 plan was released)

In the above table, the alternatives that close the most winter range to motorized use are Alternatives 1 and 2. Alternative 3 nearly maintains current closures and Alternatives 4, and 5 would open some currently closed areas increasing the potential for negative impacts on wintering big game. Table WL-9, below indicates the same information as the percentage of winter range that is non-motorized.

Table WL-9. Percent of Big Game Winter Range Identified as Non Motorized

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	EC
Total Winter Range W-C N.F.	245,400	245,400	245,400	245,400	245,400	245,400	245,400	245,400
Non Motorized Winter Range	222,800	222,100	136,700	88,300	129,500	166,700	190,700	149,100
% Winter Range Non Motorized	91%	91%	56%	36%	53%	68%	78%	61%

It is noted that the important factor is not how many acres are open to snowmobiling but what acres are actually used and accessible.

If more acres are open to snowmobiling there could be greater adverse impacts to wintering wildlife, depending on where the areas are. This affects big game on winter range by disturbance and species like the lynx and wolverine at higher elevations by disturbance and/or increasing access for competing predators over compacted snow.

In Lynx Analysis Units (all of the Uinta Mountains) the Lynx Conservation Strategy recommends no net increase in the amount of groomed or designated over-the-snow routes or snowmobile play areas. The intent is to allow no more than existing compaction of snow in these areas because of potential for reducing the competitive advantage lynx has in uncompacted snow. Alternatives 1 and 2 would reduce the areas open to winter motorized use in the Uinta Mountains significantly while Alternatives 4 and 5 would open some currently closed areas to motorized use which is inconsistent with the Lynx Conservation Strategy. Alternative 3 maintains currently open areas and

Alternatives 6 and 7 reduce the net of areas open to motorized use from existing but not to the large extent that Alternatives 1 and 2 do. Each of the Alternatives that reduce areas open to winter motorized use in the Uinta Mountains are consistent with the Conservation Strategy.

Effects on Terrestrial Wildlife from Timber Management

Potential impacts include fragmentation, displacement, changes in vegetation structure and age class and grazing. In general, mature and old age classes currently dominate timber cover types. This may be less true on private lands adjacent to the Forest. Loss of the aspen type to conifers through natural succession and fire suppression decreases vegetative diversity that affects many species of wildlife. Alternatives with more potential for timber harvest, would benefit species that prefer more open areas in earlier successional stages, like the snowshoe hare. Species such as the woodpeckers, that prefer mature and old growth where insects are more plentiful would see a reduction proportional to the amount of timber harvest in habitat meeting these needs. Regardless of alternative, species that benefit from older age classes would continue to have an abundance of available habitat because of current conditions and the relatively small acreage to be harvested.

Table WL-10. Possible Harvest in Aspen and Conifer in the 10 Year Peiod

Available Timberland[1]	Alt.1	Alt. 2	Alt.3	Alt.4	Alt. 5	Alt.6	Alt.7
Suited for Timber Production (Acres)[2]	0	0	38,000	193,900	226,000	28,900	28,900
Unsuited *and* Harvest Allowed[3] (Acres)	0	79,900	131,600[4]	55,200	71,800	72,100	171,400
Total Acres of Timber Available	0	79,900	169,600	249,100	297,800	101,000	202,100
Allowed Acres Harvested Over 10 Year Period Aspen and Conifer	0	6,500	7,500	12,500	15,500	5,000	8,500

[1] From GIS layer of available capable aspen and conifer merged with management prescriptions for each alternative.
[2] Areas available and capable with Management Prescription 5.2 or 6.2.
[3] Areas available and capable with Management Prescriptions that allow other harvest for non-timber objectives.
[4] Of these acres, an estimated 60,000 allow harvest but no road construction.

The most benefits for wildlife would come in alternatives 7, 3, and 2. The most land available for harvest in these alternatives is in the unsuited with timber harvest allowed for other resource purposes. With this, harvest areas could be designed to provide the largest benefit to wildlife by more strongly considering the juxtaposition and age class diversity of harvest areas. Alternatives 4 and 5 have an abundance of suited timberlands in the 5.2 prescription and timber is harvested with more emphasis on timber harvest and monetary returns to the government and logger.

With the projection of flat budgets, and the low level of management activity, and the goal of managing for PFC, wildlife on the Forest should be maintained at present levels if influences outside of the Forest do not cause decreases. Some species such as the goshawk will have reduced habitat due to the shift in mature and old growth but they will still function within the historic range of variation. Habitat for snowshoe hares would increase due to the set back of succession and the development of an understory of brush and young conifers to provide cover and forage. Ground nesting and open canopy landbirds would also benefit. Forage would increase for big game animals although with most timber harvest being accomplished in summer range this would be less of a benefit than it would be if the production is on winter range.

There would be road construction in connection with some timber harvest. See the section on effects from Roads and Access Management.

Effects on Terrestrial Wildlife from Recreation

Use of developed recreation sites is dictated by the size of the site. Differences in use levels from the present plan would be determined by newly developed sites. There are no new developed sites identified in alternative 1. All other alternatives identify 2 new developed sites.

In prescription 4.2, recreation non-motorized, the larger the area the larger the benefits to terrestrial wildlife are. Wildlife would have more secluded areas to feed and rest in. When spread out across the Forest there is not enough difference between alternatives, except possibly for alternatives 5 and 6, to make a measurable difference.

Motorized recreation settings (4.3 and 4.4) have the greatest potential for adverse effects on wildlife through the displacement caused by use on roads and trails and the destruction of habitat through indiscriminate cross-country travel.

Prescription 4.3 is just the converse of 4.2 in that with backcountry motorized the smaller the acreage the larger the advantage to terrestrial wildlife. Again, the very small differences between some of the alternatives would make a measurable difference impossible. Alternative 4 by far has the largest advantage to wildlife with a very small amount open to motorized travel.

Like prescription 4.3 in 4.4, recreation motorized, the less acreage is the most advantageous to terrestrial wildlife. Again, alternative 4 has the largest advantage to

wildlife with the other alternatives being so close that the disadvantages would be the same.

Table WL-11. Comparison of Motorized and Non Motorized Recreation Settings

	Acres by Alternatives						
	1	2	3	4	5	6	7
4.2 Recreation Non-motorized Recreation Settings	4,500	3,600	3,200	3,900	20,500	20,000	3,500
4.3 Backcountry Motorized Recreation Settings	16,000	25,000	30,600	1,800	17,300	32,600	27,100
4.4 Recreation Motorized Recreation Settings	30,900	38,300	41,700	16,600	78,200	49,100	53,800

Management areas where ski resorts are located are the Central Wasatch and North Wasatch-Ogden Valley. Alternative 5 is the only alternative where ski resort expansion is allowed (expansion is defined as additional acres being added to a current permit or a new resort permit is issued). Potential effects from expansion are vegetative type changes if new runs are cleared, fragmentation of habitat and displacement of species. Expansion is not permitted on any of the existing permits although infrastructure improvements within the permit areas are permitted. New expansion proposals would be handled on a case-by-case basis with the proper NEPA documentation and decision. It is not possible to make determinations on the effects on wildlife beyond what is stated here with no concrete proposals in hand.

Effects on Terrestrial Wildlife from Livestock Grazing

Impacts of livestock grazing on wildlife include displacement of wildlife, potential for disease transmission, and changes in plant composition and vegetation community succession that can cause unfavorable habitat conditions for some wildlife species. Desired future conditions for vegetation developed in the 1996 Rangeland Health Amendment and described in the Revised Forest Plan as well as those to be developed site-specifically for individual grazing allotments take wildlife habitat needs into account. To achieve these conditions, grazing standards and guidelines are also contained in the Revised Forest Plan. Full compliance with these will have positive effects on wildlife habitats within active grazing allotments.

Both upland and riparian areas in unsatisfactory condition provide decreased quality and quantity of habitat for associated suites of wildlife species. One difference between alternatives for Forest Plan Revision is the degree to which they provide for rehabilitation of these areas through both vegetation treatments and improved livestock grazing management. In alternatives that remove lands in unsatisfactory condition from grazing suitability, there would likely be a range of improvement probability that can only be predicted with site-specific assessment. Factors include whether or not these are areas that can be easily avoided through livestock herding, and/or salting, and whether or not fencing is a viable option. Any improvement in condition would be a favorable effect for some wildlife species. Alternatives 1, 2, and 6 would result in this range of improvement

on a total of 18,300 upland and riparian acres and Alternative 3 would result in 2,100 acres with a range of improvement on riparian acres. In addition, Alternative 2 would remove livestock grazing from 26,000 acres in watersheds with cutthroat trout emphasis providing for improved upland vegetation and wildlife habitat conditions as well.

Alternative 7 (and the Revised Forest Plan) includes a **forage utilization guideline** for lower (30-40%) allowable use on areas in unsatisfactory condition rather than removing these areas from suitability. With implementation of this Guideline, areas of both upland and riparian vegetation in unsatisfactory condition would improve with riparian areas restored more quickly than uplands. Improvement would be more consistent overall than in Alternatives 1, 2, 6, and 3 because a lower utilization standard could be applied to all the areas more easily than total avoidance of the areas.

Alternatives 4 and 5 do not remove areas in unsatisfactory condition nor do they implement a lower forage utilization allowance for these areas. Some improvement of these areas is expected through implementation of management direction from the 1996 Rangeland Health Amendment, however it is expected that it would be more gradual and less consistent than in any of the other Alternatives.
An additional difference between alternatives with regard to livestock grazing effects on wildlife is the relative reduction of risk for disease transmission from domestic sheep to bighorn sheep. Discontinuing domestic sheep grazing in overlapping areas used by domestic sheep and bighorn sheep in the Eastern Uinta Mountains and Western Uinta Mountains Management Areas would reduce the risk of disease being transmitted from domestic to bighorn sheep. Alternatives 1, 2, 6, and 7 reduce this risk by closing the three currently vacant allotments (Burro Peaks, Thompson Peak, and West Beaver).
In addition to these vacant allotments, Alternatives 1, 2, 6 and 7 would discontinue domestic sheep grazing on three sheep allotments (Gilbert Peak, Henry's Fork-Hessie Lake, and Red Castle) that overlap current bighorn sheep habitat *if* permits were *voluntarily* waived without preference. Alternative 7 would extend the area protected further for bighorn sheep to four additional allotments (East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater) immediately to the west, again *if* those permits were *voluntarily* waived without preference. These closures would extend bighorn sheep habitat and protection from disease across the upper Uinta Mountains.

Finally, disposition of other vacant allotments (not associated with bighorn sheep habitat) is a difference between alternatives with implications for effects on wildlife. Closure of vacant allotments allows for ungrazed areas to provide for long-term habitat without wildlife displacement and without grazing associated changes in vegetation affecting habitats. Alternatives 1 and 2 provide the most long-term habitat benefit closing all vacant allotments. Alternative 7 provides somewhat less long-term habitat benefits than 1 and 2 because it focuses closures only on Salt Lake and Davis County watershed (in addition to the bighorn sheep habitat discussed above). Alternative 6 provides the long-term benefits for bighorn sheep habitat but not for the other vacant allotment areas. Alternatives 3, 4, and 5 do not close vacant allotments thus not providing for long-term habitat benefits although short-term, the allotments would likely continue to remain in ungrazed condition. This is because experienced budget levels have not been adequate to

conduct required analyses on active allotments, making analyses required for stocking of vacant allotments a low priority. This is not expected to change within the planning period.

Effects on Terrestrial Wildlife From Oil and Gas Activities

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" as described in Topic 9 – Oil and Gas. It is estimated to be about 68,300 acres.

Generally, direct and indirect effects to terrestrial wildlife habitat include potential loss of habitat, fragmentation of habitat, displacement due to traffic, noise and human presence, and possible mortality along roads. Effects to big game wildlife species may be increased if they are disturbed during critical seasons of use, such as during birthing and wintering phases. Raptor species react differently to human interference. Oil and gas activities could result in destruction of nests, elimination of essential habitat components and abandoning nests with eggs or young. Reducing the density of trees in some areas could be beneficial to some raptor species by increasing their hunting capabilities. Activities adjacent to wetland and riparian areas where shorebirds and waterfowl may nest could adversely affect the reproductive success of these birds. Non-game species will be displaced and habitat disrupted by oil and gas activities (USDA Forest Service 1994a). As with many activities, oil and gas development will have negative impacts to some species while some activities may be beneficial to other species. Acres cited below are those directly affected, where vegetation is removed for road and well pad construction.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alt 4) an area of existing leases, the Table Top Unit, could be explored and result in effects to wildlife habitat. The degree to which exploration is predicted within the Table Top Unit is affected by whether or not new leases could be issued and under what stipulations.

Lease Notices would be attached where threatened or endangered wildlife species are potentially located. This would ensure the protection of these species through the Endangered Species Act.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect wildlife habitat. Loss of habitat because of oil and gas exploration activities is estimated to be 20 acres. In areas outside of the Table Top Unit that are not currently leased there would be no effects to wildlife. Once existing leases expire, Alternative 1 would likely provide the greatest protection to wildlife because the area is recommended as wilderness.

Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could affect the wildlife habitat on about 20 acres. Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining

available acres, new leases could be issued but surface occupancy would not be allowed. No direct loss of wildlife habitat would occur but there may be some indirect effects, such as displacement if directional drilling occurred from adjacent lands since an access road would likely be constructed to the drill site and the sounds associated with construction and drilling may be heard from within the Appeal Settlement Zone.

Alternative 3 precludes new leases in areas recommended for wilderness and does not allow surface occupancy in areas managed for undeveloped and backcountry recreation values. Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,500 acres are available under Standard Lease Terms. Oil and gas activities are estimated to disrupt wildlife habitat on about 75 acres. Some of this development is predicted from existing leases within the Table Top Unit. Elk and bighorn sheep calving/lambing or winter range areas are protected with No Surface Occupancy or Timing Limitation stipulations to restrict activities during critical periods. Disruption and displacement causing stress to these species from oil and gas activities would be reduced. A Controlled Surface Use Stipulation would be attached to all leases requiring surveys to determine the possible presence of any sensitive wildlife species. Operations would be designed or located so as to not adversely affect the viability of the population.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely.

Alternative 5 leases under standard lease terms. Oil and gas activities are estimated to disturb about 105 acres. Habitat could be disrupted and some species could be displaced. There would be a direct loss of habitat and habitat effectiveness could be diminished during the life of the producing field. Some of the effects could last 20-30 years because of field development. Standard lease terms allows moving operations up to 200 meters or delaying operations up to 60 days. For some critical wildlife periods, such as elk calving period and bighorn sheep lambing, (approximately 60 days), Standard Lease Terms could provide adequate protection. For other periods such as the wintering period for elk and moose (a period of over 150 days), Standard Lease Terms would not be adequate to protect them and could force them to move into marginal habitat creating additional stress. Relocating well pads or rerouting pipelines and roads up to 200 meters could reduce impacts to critical areas to some extent. Introducing increased public access into currently isolated areas could alter the quality and quantity of all habitats.

In Alternative 6, new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by prescription. Leases would be issued in areas managed for recreation motorized values and terrestrial habitat with appropriate stipulations applied. Oil and gas activities are estimated to disrupt wildlife habitat on about 75 acres. Effects to wildlife in the Table Top Unit where leases are reissued are expected to be less than Alternative 3. In the remainder of the area the effects to wildlife habitat would be minimal because of no surface occupancy.

Alternative 7 would preclude leasing on 20,400 acres recommended for wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Habitat could be directly affected on about 85 acres and some species could be displaced due to exploration and development. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Under Alternative 7 increased access into currently isolated areas could alter the quality and quantity of all wildlife habitats. There would be a direct loss of habitat and habitat effectiveness could be diminished during the life of the producing field. Some of the effects could last 20-30 years. In critical big game habitats operations are precluded during critical times of the year on about 1,100 acres. Disruption and displacement causing stress to these species from oil and gas activities would be reduced. A Controlled Surface Use Stipulation would be attached to all leases requiring surveys to determine the possible presence of any sensitive wildlife species. Operations would be designed, located, or timed so as to not adversely affect the viability of the population.

Effects on Terrestrial Wildlife from Fire Management

Prescribed fire will have the effect of setting back succession and favoring species that use younger age classes. Effects are similar to timber harvest though on a much broader scale. Prescribed fire offers opportunities in the non-timber types such as sagebrush and oak. Where oak interfaces with urban areas mechanical treatment will be substituted for fire with the same effects. Opportunities are listed in the following table:

Table WL-12. Acres treated by Alternative Over 10 years

Vegetation Type Treated	Alternatives						
	1	2	3	4	5	6	7
Prescribed Fire- Aspen & Aspen/Conifer Mixed	0	80,000	32,000	7,200	7,200	32,000	32,000
Prescribed Fire- Douglas-fir (non-lethal)	0	4,000	2,000	0	0	2,000	2,000
Prescribed Fire- Sagebrush/PJ	0	40,000	20,000	10,000	10,000	20,000	20,000
Prescribed Fire- Oak	0	40,000	20,000	8,000	20,000	20,000	8,000
Mechanical Treatment- Oak	0	16,000	8,000	0	8,000	8,000	20,000
TOTAL acres over 10 years	0	180,000	82,000	25,200	45,200	82,000	82,000

Prescribed fire and mechanical treatment, by improving the age class distribution of vegetative types towards PFC within the historic range of variation, will benefit the most species of terrestrial wildlife.

Wildland fire has the potential of burning large areas, creating younger age classes and adding diversity because of the mosaic created by the fire. Wildland fire use has the same potential in a more planned manner with reduced costs and impacts of suppression.

Effects on Terrestrial Wildlife from Roadless Area Management

Terrestrial wildlife exists better in secluded quiet settings that are not fragmented. Roadless areas provide this type of an environment. As roads are added fragmentation increases and use of the roads displaces many wildlife species and affects the naturalness of the area. The fewer the roads the bigger the benefit is to wildlife. This is displayed in Table WL-14.

Allocations of acreage to non-motorized recreation (only the Semi-Primitive Non-Motorized category) are highest in Alternative 1, and next highest in Alternative 2. Alternative 5 provides the least acreage to this category. Alternatives 6, 7, and the Existing Condition are about equal. Alternative 3 falls between the extremes of the other alternatives.

The existing condition in roadless areas for motorized recreation provides 239,100 acres within motorized recreation ROS categories (the sum of Rural, Roaded-Natural, and Semi-Primitive Motorized); Alternative 7 provides the same amount. Alternative 5 has the most acreage in motorized ROS categories for inventoried roadless areas – 325,400, and Alternative 1 has the least – 112,900. Alternative 2 has 221,800 acres; Alternative 3 has 254,900 acres; Alternative has 364,900 acres; and Alternative 6 has 241,100 acres.

Summer motorized use is restricted to designated Forest system roads and motorized trails. While the acreage allocations shown in the ROS tables might seem to indicate that large areas are for available motorized use, in fact the area actually available for use is considerably smaller and limited to appropriate routes. ROS for motorized categories shows areas where the influence (sights, sounds) of motorized use may be expected by a forest visitor.

Table WL-13. Acres of Roadless Area Designations by Alternative

Activity	Acres by Alternative							
	1	2	3	4/1985	5	6	7	EC
NA	0	0	0	31,220	0	0	0	0
Rural	6,500	6,400	8,400	2,200	10,400	6,800	0	0
Roaded Natural	50,800	106,700	113,100	294,100	135,000	114,300	96,200	96,200
Semi Primitive Motorized	55,600	108,700	133,400	68,600	180,000	120,000	142,900	142,900
Semi Primitive Non-Motorized	492,900	384,000	350,900	209,800	280,200	365,500	366,800	366,800

Cumulative Effects on Terrestrial Wildlife Species

Cumulative effects will vary due to the individual needs and habitat of individual species and impacts from resource uses outside the Forest. Cumulative effects to wildlife are also based on the cumulative effects described for vegetation, watersheds, and aquatic resources, in their respective sections in this chapter.

Past impacts have included commercial and firewood harvest of timber. While structure within some forested stands has been altered, mature overstory canopies have remained due to a lack of clearcutting (except in lodgepole) or other such even-aged management methods in coniferous stands. Current harvesting methods and those planned for use in the future are uneven aged methods in spruce-fir and mixed conifer stands dominated by spruce, and even-aged methods in lodgepole pine stands, mixed conifer stands dominated by lodgepole pine, and aspen stands.

Temporary changes in habitat may be evident through vegetation management or similar type non-permanent disturbances. Commercial timber, prescribed burning and wildland fire (including wildland fire use) are methods used for these temporary changes. These treatments would meet requirements for residual habitat components such as snags, dead and down material, and landscape structure. It is not likely that these activities in combined total would affect any of the wildlife MIS or SOR to the point where viability is compromised beyond current conditions. With the Forest adhering to the most current and preventative measures available for managing habitat, the cumulative effects to the species are anticipated to be minimal as a result of management activities proposed in all alternatives. Old growth would be retained to meet the planned requirement of 20% per vegetative community (30% in aspen).

Livestock grazing has caused the loss of some forb communities and altered the understory of forested communities and the structure of shrub and grass/forb communities. However, grazing levels (in terms of number of livestock and use levels) have been greatly reduced from earlier decades.

Livestock grazing and associated soil loss has altered watershed conditions and aquatic habitats for many species. While management is planned to alter these conditions and prevent any future impacts, recovery may not occur at a rate substantial enough to affect a change in the long term, particularly in terms of vegetative conditions. Watershed and fisheries projects are designed to improve these habitats.

The lack of younger seral conditions is of concern from a diversity of habitat standpoint. Management directed at striving for PFC of vegetation communities would provide improved habitat for many species.

Prescribed fire, wildland fire use, and mechanical (commercial harvest or other methods) methods would be used to diversify structural stages in all alternatives, although it is not anticipated that the level of activity proposed would bring the communities within PFC within the next several decades due to the inability to treat enough habitat, which is in

part due to other resource concerns (e.g. air quality) and in part due to funding. With alternatives that do not allow or significantly limit timber harvest these treatments may become dependent on prescribed fire and wildland fire use

Potential habitat disturbances can be summarized by the number of acres disturbed through typical management activities. While development of roads and campgrounds was much greater through the 1960's, it is not anticipated that the rate of increase will be that great in the future. In addition, some acres of habitat may be gained if roads are decommissioned, however this is an unknown level at this time.

Species with unknown distributions and threats, such as the wolverine, may have more specific management direction applied should ongoing and recent studies and assessments indicate a need for listing under the Endangered Species Act. There are also potentials for immigration from other listed species, such as the wolf, into the Wasatch-Cache NF.

Introductions of non-native wildlife species, which is largely outside of Forest Service control, have the potential to increase cumulative effects through diseases or through resource competition. In all introductions the Forest Service has the responsibility to work cooperatively with the State to assess habitat and potential impacts.

For wildlife species that are subject to hunting or trapping (e.g. big game and beaver), state regulatory mechanisms are responsible for the sustainability of these populations, and directly affect the ecology of managing these species. Should severe winters occur, effects would be more severe on big game species due to the reduction in amount and quality of winter range, primarily off Forest.

Regional risk trends for many species of wildlife are due to trends started during past heavier exploitative uses of habitat. While recovery is slow, it is perceived to be occurring for some habitats and species, although the loss of other habitats in areas being developed or converted to annual grasses and invasive weeds is also of regional concern for many species, both on the Forest and adjacent to it.

While cumulative impacts within the Forest may affect some species, the implementation of goals, objectives, standards and guidelines are expected to conserve existing habitat and improve habitat for some of these species. By managing within the range of historic variation and properly functioning condition it is expected that all species will be sustained in the long term.

Cumulative Effects from Nearby Lands

On lands outside the National Forest, most of the activities with the potential to negatively affect terrestrial resources are outside of Forest Service jurisdiction, such as timber sales on private lands and urban development. The cumulative effects for wildlife resources considers land within the Forest boundary, but takes into consideration the private, state, other National Forest, and BLM lands adjoining it as wildlife do not

recognize property boundaries. The trends of a predominance of mature vegetative conditions occur similarly on adjoining federal and state lands, largely due to similar fire suppression practices. The value of habitat on the Forest would continue to be of higher importance as private land adjoining the Forest is developed in the future. The similar management methods on the Uinta National Forest to the south, the Ashley National Forest to the east, and the Caribou National Forest to the north provide assurance on the maintenance of suitable wildlife habitat and connectivity of forested habitats, although similar concerns on lack of young seral conditions exist.

With the predicted expansion of urban areas adjacent to the Forest, and on inholdings within it, the value of the Forest as a biological reserve will continue to escalate. Urban areas will exert the most influence on the Forest, through fire suppression needs and risks, through expansion of noxious weeds and other undesirable or non-native vegetation species, and through the increased user demand for recreation on the Forest. Urban expansion and development on private in-holdings within the Forest have the potential to increase fragmentation and reduce connectivity of habitats. Similar impacts are anticipated in winter range areas because of their lower elevations and development. These expansions would not likely affect old growth conditions.

Concern is generated should trends of increased use of water diversions and increased recreation demands continue, carrying an associated risk of population declines and potential risks in viability depending on the needs of individual species. Similar trends are anticipated on National Forests and BLM lands adjacent to the Wasatch-Cache.

Fragmentation/Connectivity

“Fragmentation” of habitat on the Forest is naturally occurring in many areas, especially the overthrust belt and the western Uinta Mountains, as is evident viewing the vegetation map. In these areas there is a high degree of dispersion of native vegetative communities, rather than more contiguous or larger blocks of continuous forest canopy. The exception to this is in the Uinta Mountains in the lodgepole, mixed conifer, spruce-fir vegetation type. No conversion or loss of vegetation types has occurred to increase fragmentation at a large scale on the Forest. The high degree of mosaics was likely historically present, however likely represented by more structural diversity within vegetative communities. Smaller-scale habitat fragmentation has occurred primarily through the development of a network of roads and small recreation site developments within the Forest. Although a loss of habitat has occurred historically due to these developments, effects on fragmentation are minimal. Loss of some species such as the lynx, wolf, and grizzly bear was due to harvesting/trapping and competition from other predators, rather than an increase in habitat fragmentation.

Connectivity of habitats at this point has mostly been compromised through development of urban areas adjacent to the Forest. Other than paved highways and small utility corridors, the Forest remains largely intact from its original composition.

The maintenance of the forested corridor of connectivity along the Wasatch Range north to Idaho and Wyoming, south to the Uinta NF and east to the Ashley NF is important. Private land use is the greatest threat to this corridor. Corridor use is important for wide ranging species such as neo-tropical migratory birds, raptors, and for larger bodied mammals that are capable of dispersing across many miles

For some species, such as neo-tropical migratory birds and wide-ranging carnivores, impacts from far off-site areas such as deforestation in Central America or urban expansions in the northwest and western U.S. may have far greater effects on fragmentation and viability than those of Forest management activities both on the Wasatch-Cache and neighboring lands.

Evaluating Viability for Terrestrial Species

A national *White Paper on Managing Viable Populations* provides the most recent direction for considering species diversity and viability (USDA 2001b). The white paper viability process involves eight steps based within a timeframe of both the planning process (15 years), and a more ecologically based timeframe of 100 years. The eight steps involve: 1) describing the ecological context; 2) identifying the species at risk; 3) collection of information on species-at-risk; 4) identification of species groups and focal species; 5) description of conservation measures; 6) incorporating the conservation approaches into the alternatives; 7) evaluating the effects of alternatives; and 8) monitoring.

Expert reviews were conducted for the species chosen, the groupings, the assessment process, and the outcomes. These reviews will continue throughout the Environmental Impact Statement (EIS) process period.

No modeling or population viability analyses were conducted for any of the species due to a lack of population specific information on life histories and habitat relationships. Rather, a ecosystem sustainability approach was taken.

For the W-C Forest Plan revision, the term “species-at-risk” includes:

-Fish and Wildlife Service endangered, threatened, candidate, proposed species.
-Regional Forester designated sensitive species.

Also considered are:

-Species classified by The Nature Conservancy as G1, G2, and G3.
-Species classified by the State Natural Heritage program as S1, and S2.
-Partners in Flight species of concern (except for some fringe species for Utah).
-Species identified by the Forest that do not appear on any other lists.

Species-at-risk for the Wasatch-Cache National Forest are identified in Appendix B. The SAR list is dynamic and species will be added as deemed necessary or removed as

recovery occurs or new information indicates they are not at risk. As viability for all species is required, consideration of these species helps ensure this provision is met. Risks identified for these species are varied, but include, grazing, fire suppression, succession, developed sites, displacement, logging, energy development, water development, pesticides, fragmentation and non-natives. In summary, the implementation of standards and guidelines in the proposed forest plan would conserve existing habitat, improve habitat, and provide for the viability of SAR. By managing within the range of historic variation and properly functioning conditions it is expected that all species will be sustained in the long term.

Legal mandates and regulations (i.e. Endangered Species Act) and policy (i.e. sensitive species management) will continue as separate processes for threatened, endangered, and sensitive (TES) species listed under the SAR. These require analysis for any project implemented through the Revised Plan to ensure that negative effects are avoided and that viability is provided for these species. MIS species are also considered in most project specific analyses, though frequently in less detail. A heightened awareness of the non-TES and non-MIS species at risk and their habitat requirements in project planning is warranted to prevent them from becoming listed. Species not specifically addressed through implementation and monitoring for TES or MIS species will be managed for opportunistically.

Topic 2 – Biodiversity and Viability

Aquatic and Semi-Aquatic Resources

Introduction

Management of aquatic and semi-aquatic species on the Wasatch-Cache National Forest requires a coordinated effort between the Utah Division of Wildlife Resources, Wyoming Game and Fish and the USDI Fish and Wildlife Service. This section addresses the Laws and Policies, the general condition of aquatic resources, the species that inhabit the aquatic and semi-aquatic habitats and how the individual alternatives may affect these resources.

The WCNF is critical in providing for the long-term preservation of June sucker and Bonneville and Colorado River cutthroat trout in the Intermountain West. The Forest also provides important habitat for spotted frogs and other amphibians.

Laws, Policy, and Direction

The Endangered Species Act. 1972. Endangered Species Act of December 28, 1973, (87 Stat. 884 as amended; 16 U.S.C 1531, 1532, 1533, 1536, 1540) declares that "…all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

The National Forest Management Act. 1976.
Policy and direction are outlined for riparian and aquatic resources can be found in Forest Service Manuals 2500 and 2600, and the following Forest Service Handbooks: 2510, 2511, 2521, 2526, 2527, 2531, 2532, 2541, 2542, 2552, 2554, 2601, 2603, 2604, 2620, 2621, 2622, 2623, 2624, 2625, 2670, 2672, 2676, 2509.18, and 2509.22.

Affected Environment

Habitat

The Wasatch-Cache National Forest (WCNF) includes approximately 1,200 miles of perennial streams and 2,200 miles of intermittent streams. The Forest also contains 4,700 acres of lakes and ponds, 4,400 acres of reservoirs and 2,300 acres of marshes. Habitat conditions across the forest are good with many stream and lakes containing trout. In a number of cases, man has altered the habitat to meet needs of the time. These alterations include the construction of roads across streams, the construction of dams and diversions, and the modification of stream channels to minimize flooding and to provide a means to transport railroad ties to the market. Timber harvest, grazing, and recreational activities have also impacted aquatic and semi-aquatic species habitats.

From the **Status Review For Bonneville Cutthroat Trout (***Oncorhynchus Clarki Utah),* it states, "Trout, regardless of their evolutionary history, require 4 types of habitat during various

stages of their life history: spawning habitat, nursery or rearing habitat, adult habitat and overwintering habitat. Spawning gravels are required for spawning success and can be a limiting factor in high gradient streams where the current carries off suitable spawning gravel (Behnke 1992). Conversely, an even greater concern may be accumulation of fine sediments into interstitial spaces of spawning gravels which prevents egg incubation and reduces larval survival. Such fines can become dominant in the sediments when poor land-use practices alter flow regimes, remove riparian vegetation, and/or degrade overall watershed conditions. These human-induced activities can aggravate already fragile soils and geology in vulnerable desert climates."

Fish

There are at least 24 fish species that occur in the waters of the WCNF. Eight of these were historically found within the planning area (Table AQ-1). More than 14 fish species have been introduced to enhance sport-fishing opportunities. In the 1985 Forest Plan Analysis of Management Situation (AMS) there are 24 species of fish listed. Of the fish species listed, it is questionable if lake trout, redside shiner and Utah chub were ever found on the Forest. None of these species have been found in surveys conducted over the past 8 years. Many of the fish species found on the Forest are considered economically important from a recreation and/or sport fishing perspective. While these fish may never have been found on the Forest, literature sources (Sigler 1963, Sigler 1987, Sigler 1996) do not distinguish between National Forest System (NFS) lands and non-NFS lands. The Paiute sculpin, Tiger Muskie and the June Sucker have been added to the species list. The Paiute sculpin has been identified in the lower Logan River. Tiger muskies have been introduced into Pineview Reservoir and provide a large predator to maintain sunfish sizes. June sucker were stocked in Red Butte Reservoir in the early 1990 for holding and have since successfully reproduced.

Bonneville Cutthroat Trout *(O. clarki utah)* [Status: Petitioned for listing as "Threatened"—ESA; "Conservation Species"—State of Utah, "Native Species Status 2"—State of Wyoming, S2-Natural Heritage Rank]

In 1997, Utah's Governor signed a bill making the Bonneville cutthroat trout the state fish of Utah (Utah State Library, 1997). Historically, Bonneville cutthroat trout occupied approximately 90 percent of the Bonneville Basin (Duff 1996). Bruce May, (Personal communication, Inland Cutthroat Trout Conservation Coordinator, May 2000) in a rough estimate, suggests that Bonneville cutthroat trout are presently found in about 5 percent of their historic habitat. Further, 80 to 90 percent of the remaining populations currently reside on NFS lands (ibid.). This subspecies is found on seven national forests in Wyoming, Idaho, Nevada and Utah. In the spring of 1999, of the 129.4 miles of stream currently occupied by Bonneville cutthroat trout in Utah, 70.4 miles (54%) are found on the WCNF. Thus, preserving the Bonneville cutthroat trout on the Forest is essential to the long-term preservation of this subspecies within the range of the species. Based on geologic history and location, Bonneville cutthroat trout was split into two management areas by the Bonneville Cutthroat Trout Conservation and Recovery Team: the Bear River Geographic Management Unit (BRGMU) and the Northern Geographic Management Unit (NGMU).

The BRGMU starts in the Uinta Mountains of Utah, drains into Wyoming, back into Utah, back into Wyoming, into Idaho (with connection to Bear Lake in Utah and Idaho), and then back into

the Wasatch Front of Utah before draining into the Great Salt Lake. Many of the small headwater tributaries are diverted for agricultural and municipal uses preventing species from migrating from the side tributaries into the mainstem Bear River and isolating populations into small headwater streams. A number of reservoirs have been installed providing for late summer irrigation flows. However, there are a few drainages that have a number of interconnected tributaries. On the Wasatch-Cache National Forest these include: Mill Creek (Summit County), upper mainstem Bear River, Woodruff Creek, Logan River, and the Blacksmith Fork River.

Table AQ-1. Fish believed to have been found pre-settlement (1845) on the land currently administered by the Wasatch-Cache National Forest. Fish found downstream from the Wasatch-Cache National Forest that may be affected by land management activities. Fish introduced on the land administered by the Wasatch-Cache National Forest that continue to persist as of January 2002.

a. Fish	b. Scientific Name	Historically	Downstream	Introduced
Cutthroat Trout, Bonneville	*Oncorhynchus clarki utah*	X		
Cutthroat Trout, Colorado	*Oncorhynchus clarki pleuriticus*	X		
Long Nose Dace	*Rhinichthys cataractae*	X		
Mottled Sculpin	*Cottus bairdi*	X		
Paiute sculpin	*Cottus beldingi*	X		
Mountain Whitefish	*Prosopium williamsoni*	X		
Mountain Sucker	*Catostomus platyrhynchus*	X		
Bluehead Sucker	*Catostomus discobolus*	X		
Colorado Pikeminnow	*Ptychocheilus lucius*		X	
Colorado River Roundtail Chub	*Gila robusta robusta*		X	
Humpback Chub	*Gila cypha*		X	
Bonytail Chub	*Gila elangas*		X	
Razorback Sucker	*Xyrauchen texanus*		X	
June Sucker	*Chasmistes liorus mictus*		X	X
Arctic Grayling	*Thymallus arcticus*			X
Black Crappie	*Pomoxis nigromaculatus*			X
Bluegill	*Lepomis macrochirus*			X
Brook Trout	*Salvelinus fontinalis*			X
Brown Trout	*Salmo Trutta*			X
Common Carp	*Cyprinus carpio*			X
Golden Trout	*Oncorhynchus aguabonita*			X
Kokanee (lacustrine sockeye salmon)	*Oncorhynchus nerka*			X
Largemouth Bass	*Micropterus salmoides*			X
Rainbow Trout	*Oncorhynchus mykiss*			X
Smallmouth Bass	*Micropterus dolomieu*			X
Tiger Muskie	*Esox ♀masquinongy X ♂lucius*			X
Yellow Bullhead Catfish	*Ameiurus melas*			X
Yellow Perch	*Perca flavescens*			X
Yellowstone Cutthroat Trout	*Oncorhynchus clarki bouvieri*			X

(Adapted from Lentsch et al. 1995)

The NGMU includes the tributaries along the Wasatch Front from Perry Creek, near Brigham City, Utah on the north, to Salt Creek, near Nephi on the south. This area includes a number of large river, many steep headwater tributaries, reservoirs and natural lakes. On NFS lands, the populations of Bonneville cutthroat trout in the NGMU are restricted to small headwater tributaries. Many of these tributaries are diverted at the forest boundary for agricultural or municipal use. Many of these small populations have been lost since the coming of the European settler. Some of the populations were lost as a direct result of habitat alteration from the 1983 floods. In the spring of 1983, mudflows out of Willard and Parish Creeks were believed to be of such magnitude that the cutthroat trout populations were lost. In other tributaries this was less the case. For unknown reasons, cutthroat trout have also been lost from a number of other tributaries. A good example is Big Cottonwood Creek. Once a source of eggs for Bonneville cutthroat trout (Sigler 1987), it is now void of a cutthroat trout population. Habitat alteration from mining, road construction, private development, timber harvest, stocking of non-native fish and exploitation may have all played a part in this loss. More than 10 non-native species of fish have been stocked in the Salt Lake Valley starting as early as 1871 (Sigler 1987).

On February 5, 1998, Bonneville cutthroat trout was petitioned to be listed as "Threatened" under the Endangered Species Act 5 U.S.C. 553(e) and 50C.F.R. 424.14 (Carlton, 2000.) On December 8, 1998 the 90-day finding identified that the petition had merit. The U.S. Fish and Wildlife Service found that a listing was not warranted on October 9, 2001.

Colorado River Cutthroat Trout *(O. clarki pleuriticus)* [Status: Petitioned for listing as "Threatened"—ESA; "Conservation Species"—State of Utah, "Native Species Status 2"—State of Wyoming, S2-Natural Heritage Rank]

Historically Colorado River cutthroat trout occupied all accessible cool waters of the upper Colorado River Drainage, including the Green, Yampa, Gunnison, Dolores, San Juan, Duchesne, and Dirty Devil Rivers (Young et al. 1996). Bruce May, in a rough estimate, suggests that Colorado River cutthroat trout are presently found in about 1-2% of their historic habitat (2000). Of the remaining populations, 95 to 100 percent currently reside on NFS lands (May 2000). This subspecies is found on eight national forests in Wyoming, New Mexico, Colorado and Utah. In the spring of 1999, of the 120 miles of stream currently occupied by Colorado River cutthroat trout in Utah, 35 miles (29%) (ibid.) are found on the Forest, making it an important forest for the long-term preservation of Colorado River cutthroat trout in Utah and within the range of the species. The Colorado River cutthroat trout are contained in the Northeastern Geographic Management Unit (NEGMU) (Lyntsch 1997b). The NEGMU boundary is based on geology and location.

The portion of the NEGMU that is on the Forest starts with the Blacks Fork on the northeast side of the Uinta Mountains and continues east to include the Burnt Fork and Muddy Creek drainages. It drains north from the High Uinta Wilderness in Utah, into Wyoming. Few of the small headwater tributaries have been diverted, for agricultural and municipal uses, on National Forest Lands. Most of these diversions occur where the streams leave public lands. Connectivity among streams on the WCNF is still relatively good, allowing for populations to be biologically connected. The major streams in the NEGMU include but are not limited to Muddy Creek, Blacks Fork, Smiths Fork, Henrys Fork, Burnt Fork and Beaver Creek. Brook, rainbow and Yellowstone cutthroat trout have been stocked in many of these drainages.

In December 1999, Colorado River cutthroat trout was petitioned to be listed as "Threatened" or "Endangered" under the Endangered Species Act 5 U.S.C. 553(e) and 50C.F.R. 424.14 (Petition to List the Colorado River Cutthroat Trout, 1999). The U.S. Fish and Wildlife Service is currently conducting their 90-day initial finding to identify if the petition has merit.

June Sucker (*Chasmistes liorus*) **)** [Status: "Endangered"—ESA;—State of Utah, Native Species Status 1]

The June Sucker historically inhabited Utah Lake and migrated up large tributary streams to spawn. Commercial fishing, dewatering of Provo River, and severe drought historically decimated this species. Pollution, predation by nonnative species, and hybridization with other species have been identified as major threats.

June sucker were stocked in Red Butte Reservoir, on the Wasatch-Cache National Forest, in 1992. Red Butte Reservoir is found in the Red Butte Natural Research Area. The purpose of this stocking was to provide a holding area for the fish. Since then the fish have successfully reproduced. It is suspected that there are currently more juvenile fish in the reservoir than its historic habitat of Utah Lake.

Viability Assessments of Bonneville cutthroat trout and Colorado cutthroat trout.

A viability assessment for fish species was conducted and is presented in Appendix B. All fish species on the WCNF were considered, although a viability assessment was not conducted for all. Several species were determined to have habitats that are more affected by activities outside of the WCNF, and others have such limited occurrence on the WCNF that maintenance of their habitats are assumed to be addressed by meeting standards and guidelines for water quality and riparian areas. Several native species share systems with the Bonneville cutthroat trout and Colorado cutthroat trout and are assumed to share their viability requirements. For these, the Bonneville cutthroat trout and Colorado cutthroat trout serve as indicators of viability. A review of the individual species and their habitat needs are found in Appendix B of the FEIS.

At the subbasin (4th level hucs) level, the Wasatch-Cache National Forest is expected to continue to provide habitat for the Bonneville and Colorado River cutthroat trout and many other aquatic and semi-aquatic species (Table AQ-2). There were assumptions made about effects to viability through risks and threats described above because of the lack of all the data and basic understanding of life history stages. Risks are viewed as those things occurring naturally in nature where a threat is man caused. In addition to not having a long population data set, data are also not available for these species' genetic variability, sex ratios, movements within and among populations and meta-populations. As such, assessments were made based on potential threats relative to current risk and status of the populations.

Based on the viability assessment, the species are believed to be able to persist on the WCNF under current risks and threats, although losses of some populations and declines in some metapopulations are expected. The small very isolated populations appear to be at the greatest risk of extirpation. Some of these populations will probably be lost through the actions or lack thereof of man (Table AQ-3), while other may be lost as a result of natural consequences from past actions and/or natural events. There are seven populations of cutthroat trout that we have lost or are expecting to lose over the next 15 years (Table AQ-2). A number of other populations

could be lost due to natural uncharacteristic events such as high intensity fires, debris flow, or even chemical spill. This has occurred in the past with limited documentation.

Table AQ-2. Cutthroat trout populations on the Wasatch-Cache National Forest that are believe to be headed for extirpation during the next 15 years.

6th Level HUC	Population Name	Suspected Cause	Potential Additional Action
160101010103	Hayden Fork	Limited population size. Non-native fish competition. Loss of complexity from historic tie hacking.	Treatment to remove non-native fish and habitat enhancement to restore complexity could decrease threats.
160102020403	High Creek	Interbreeding with non-native rainbow trout. No connectivity with other populations. Only hybridized cutthroat/rainbow trout have been found in the drainage.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage
160102030306	Saddle Creek	Lack of water, habitat impacts from roads, non-native fish and grazing upstream of the population. No connectivity with other populations due to intermittent stream flows. Current year class failures.	Site-specific analysis to identify exact location of the problems and potential corrective solutions need to be identified.
160201010105	South Fork Weber River	Limited population size. Non-native fish competition. Interbreeding with non-native rainbow trout.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage.
160202040102	Little Cottonwood Creek	Limited population size. Poor water chemistry (heavy metals). Upstream access to the stream and the potential for toxic spills are moderate.	Efforts to explore correction of the water chemistry problem are being made.
160202030101	Soapstone Creek	The stream has been dry by late June in 2001 and 2002, which would cause year class failures. Lack of habitat complexity. No connectivity with other populations. Limited population size.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage.
160202030101	Rock Creek	Limited habitat and water. No connectivity with other populations (suspected biological barrier).	Additional drainage wide surveys could be completed to verify if a biological barrier exists for this population.

Current threats to aquatic species include grazing, poor timber practices, road construction, recreational uses, special uses, fire suppression, energy development, water development and non-native species to name a few.

Table AQ-3. The 15- and 100 year expectations regarding the likelihood of the cutthroat trout subspecies to maintain viability at the 4th level HUC under current management.

Watershed Code	Watershed Name	15 Year Call	100 Year Call	Comments
14040106	Henrys Fork River	Viable	Viable	
14040107	Blacks Fork River	Viable	Viable	
14040108	Muddy Creek	Viable	Viable	Contingent on private land stewardship
14060003	Duchesne River	no cutthroat trout on forest	no cutthroat trout on forest	surveyed in 2001
16010101	Upper Bear River	Viable	Viable	Loss of a population
16010201	Bear Lake	Off forest	Off forest	No fish on forest
16010202	North Cache Valley	Viable (declining)	Nonviable	Loss of a population
16010203	South Cache Valley	Viable	Viable	Some populations nonviable
16010204	West Wellsville Mountains	No fish	No fish	
16020101	Upper Weber River	Viable	Viable (declining)	Loss of a population
16020102	Ogden Front	Viable	Viable (declining)	
16020203	Provo River	Viable (declining)	Viable (declining)	Loss of populations
16020204	Jordan River	Viable (declining)	Viable (declining)	Loss of populations
16020304	Rush-Tooele Valleys	No cutthroat	No cutthroat	
16020305	Skull Valley area	No cutthroat	No cutthroat	

Amphibians

In the 1985 Forest Plan AMS there are 7 species of amphibians listed (Table AQ-4). Only the spotted frog (*Rana luteiventris*) is on the sensitive species list. The Wasatch Front population was reviewed for listing and found not warranted on 23 August 2002. Boreal toad (*Bufo boreas)* identified as warranted listing but precluded in Colorado is not listed in the Utah portion of it's range. Amphibians are probably not a good group of species for monitoring management actions because they appear to be declining across the west in record numbers (Koch et al., 1996). This decline would affect the interpretation of any monitoring results.

Table AQ-4. Amphibians historically present on the Wasatch-Cache National Forest, January 2000.

Amphibians	Scientific Name
Tiger Salamander	*Ambystoma tigrinum nebulosum*
Great Basin Spadefoot Toad	*Spea intermontana*
Boreal Toad	*Bufo boreas boreas*
Boreal Chorus Frog	*Pseudaris Ttriseriata maculata*
Northern Leopard Frog	*Rana pipiens brachycephala*
Spotted Frog	*Rana luteiventris*
Woodhouse Toad	*Bufo woodhousei*

(Adapted from Lentsch et al. 1995)

Threats identified in the spotted frog 12 month finding, that would be applicable to all amphibians, include loss of habitat (caused by dam and reservoir construction, alteration of drainage patters, urban and agricultural use of water, and high and bridge construction), introduction of exotic species, lack of inventories of native wetland animals, insufficient impact analysis conducted prior to development and inadequate mitigation activities (Federal Register Vol. 67. No. 169). Loss of habitat is the primary threats to amphibians on the Wasatch-Cache National Forest. This occurs as vegetation around water sources is removed through grazing, recreational use, and timber harvest, or that reduce riparian vegetation and water. As riparian vegetation and water quality and quantity is maintained the amphibians should persist.

There is insufficient information on the current distribution, the species range across the forest or the importance of the Wasatch-Cache National Forest in the conservation of these species to conduct an analysis as to the long-term preservation of amphibian species. It is believe that with the existing standards and guidelines and the identification of riparian habitat conservation areas and the recognition of the importance of riparian areas that amphibians will persist. This assumption is made when viewing that all alternative with the exception of alternative 5 recognize the importance of clean water, riparian habitat and downed large wood than does alternative 4 or the existing conditions (Table AQ-7).

Spotted Frog

Spotted frogs are generally found in small springs, ponds or slough with a variety of herbaceous emergent, floating and submergent vegetation. Spotted frogs emerge from hibernation in the spring and tend to use different habitat. Primary prey for spotted frogs are insects. Historically, spotted frogs were found in the Beaver Creek Drainage, Summit County. Spotted frogs were last found on the WCNF in June 2002 in the Prove River Drainage below Soapstone Creek. Prior to that they a single individual was found in July 1996 at Farmington Ponds in Davis County.

In the status review (Federal Register Vol. 67. No. 169) it states “Given the habitat protection already in place, habitat loss is not likely to put the frog in danger of extinction in the foreseeable future. Overutilization is not viewed as a threat to the species because of current regulations. Disease and predation is a greater concern as a number of non-native fish species have been introduced into the area. On the Wasatch-Cache National Forest fish do not inhabitat the ponds where toads are found. Mosquito fish are identified as a primary predator of concern. No mosquito fish are found on Forest. It is currently unknown as to the impact that diseases such as Chytrid fungus may have on the spotted frogs on the Forest. The status review for the Wasatch Front spotted frog, found “the trajectory of the Wasatch Front spotted frog status continue to be towards more secure populations, reduced threats, and improved habitat conditions.” Riparian Habitat Conservation Areas around ponds and streams should provide addition protection to the limited number of spotted frogs that are found on the Forest.

Boreal Toad (Western Toad)

Tanner (1931) stated that, ”This species is far more common in the northern part of the state than in the southern. It is the common species in the canyons and mountains of central and northern Utah.” Boreal toads have been found in the Forest in recent years as far north as Temple Fork, Cache County to Little Cottonwood Creek, Salt Lake County in the south. They have also been found in the headwaters of the Bear River, in the Uinta Mountains. However, they do not appear to be as common as Tanner suggested they were in 1931. The Forest Service

has conducted limited survey work. The Utah Division of Wildlife Resources and the Forest has recently been conducting surveys for boreal toads.

Stebbins (1985) gives a good description of habitat used by boreal toads. They use a wide variety of habitats that range from desert streams and springs, grassland, woodland, and mountain meadows. They live in and near ponds, lakes, reservoirs, rivers, springs and streams and are active at night in warm, low-lying areas; diurnal at high elevations and in the north. Their elevation range is from sea level to over 11,800 feet. Muths et al. (2000) found that boreal toads are also known to travel up to 2.5 km between breeding sites.

Disturbance: Boreal toad eggs are generally laid in vegetation along the edge or in the middle of water. The eggs remain in incubation for up to 40 days in late May and June. During this time, the eggs can easily be crushed through hoof action by cattle or other animals. Toads also seek shelter in vegetation and large wood. If this vegetation is removed, the toads become more easily accessible for predation. The removal of vegetation can also impact the egg survival due to ultraviolet-B radiation from the sun (Blaustein and Wake, 1995). Shading is a critical part of the survival of eggs during incubation.

Tiger Salamander
Tiger salamanders have been found throughout the Forest in a variety of habitat, including stock watering ponds, river and streams and high elevation, pristine lakes. This species is of little value in monitoring management actions because of the diverse conditions in which it can survive.

Great Basin Spadefoot Toad
The Great Basin spadefoot toad inhabits a wide range of habitats from sagebrush flats to the spruce fir timber. Little is known of its occurrence on Forest.

Boreal Chorus Frog
The boreal chorus frog uses grassy ponds, lakes and marshes of prairies and mountains. It is well adapted to humans and is found on many farms (Stebbins, 1985). It would most likely not be a good management indicator because of its adaptability.

Northern Leopard Frog
The northern leopard frog inhabits grasslands, brush lands and woodlands and ranges high into the mountains. It frequents springs, slowly flowing streams, marshes, bogs, ponds, canals and reservoirs, usually where there is permanent water and growth of cattails or other aquatic vegetation (Stebbins, 1985).

Woodhouse Toad
The woodhouse toad frequents a great variety of habitats from grasslands, sagebrush flats, woods, desert streams, valleys, floodplains, farms, and city backyards. It prefers sandy areas near marshes, streams, ponds and irrigation ditches (Stebbins, 1985).

Conservation Approaches

Much of the management of native aquatic and semi-aquatic species involves minimizing risks and threats. We do not fully understand all of the complex relationships that cause these species

to expand or contract their geographic range, how species and individuals act and react to each other and how habitat alterations may affect individuals and populations. Therefore, threat management consists of managing above population-loss thresholds. The further above these thresholds, the more secure a population and species is. There have been several proposals made in the past to minimize the risks for fish and amphibians. These include: (1) The establishment of fish reserves (Rahr et. al., 1998), (Spangler, 1994); (2) The elimination of actions within riparian zones without site specific analysis; (3) The elimination of man's actions within known habitat; (4) The fencing of important areas to preclude livestock, wildlife and human caused trampling.

There are a number of guiding documents, directives and processes currently in-place that will aid in the long-term conservation of aquatic ecosystems and pertinent to the Bonneville and Colorado River cutthroat trout on the Wasatch-Cache National Forest. The existing documents that guide the management of the general water quality conditions may be found in this document. The existing documents that provide direction for the long-term persistence of the cutthroat trout include:

1. "Fish Stocking and Transfer Procedures" of the Utah Division of Wildlife Resources (UDWR 1997). This document set out the general policy and procedures for stocking and transplanting of fish in the State of Utah. In its policy direction it states, "Fish stocking . . .will only be conducted in a manner that does not adversely affect the long-term viability of native aquatic species or their habitat, aids native species conservation, and enhances fish populations in existing aquatic habitats and aids the efficient and effective management of recreational fisheries to provide angling diversity and participation."

2. The Conservation agreement and strategy for Bonneville Cutthroat Trout in the State of Utah" (UDWR 1997). This conservation strategy identifies the major threats and actions to be taken to preserve this species. It is generally a fish management document with minimal emphasis on habitat protection and enhancement.

3. The "Conservation agreement and strategy for Colorado River Cutthroat Trout in the State of Utah" (UDWR 1997). This conservation strategy identifies the major threats and actions to be taken to preserve this species. It is generally a fish management document with minimal emphasis on habitat protection and enhancement.

4. The "Conservation agreement and strategy for Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah and Wyoming" (CRCT Task Force 2001) provides an interagency approach for the conservation of Colorado River cutthroat trout.

5. The "Range-wide conservation agreement and strategy for Bonneville cutthroat trout (*Oncorhynchus clarki utah*)" (Lentsch et al. 2000) provides a interagency approach for the conservation of Bonneville cutthroat trout across its range.

6. The Final Environmental Impact Statement on Rangeland Health (WCNF, 1996), as ammended with this EIS, provides recognition of the value of waters with native cutthroat trout. These waters are containing native cutthroat are identified class I

riparian values.

7. The goals, standards and guides in this document also provide conservation measures along with the Forest Service Manual section 2600. As part of this direction, prior to approval of any ground disturing activity, a biological evaluation/assessment must be prepared. This document must then be signed by the botanist, trestrial and aquatic ecologists identifing the consequences of those activities.

8. A major action that has taken place is merely the general recognition of the value of the streams on the Wasatch-Cache National Forest to the long term preservation of the cutthroat trout in the states of Utah and Wyoming. In Alternative 7 this had been done by designating all areas inhabitated by cutthroat trout as perscription 3.1A riparian. This sets forth the objectives for the area and the importance of the Wasatch-Cache National Forest in preserving these species. A 3.1A designation was also placed on the lower Provo River to recognize the importance of the spotted frog populations found there.

In an effort to address the threats to aquatic and semi-aquatic species, the Forest staff reviewed all existing and proposed standards and guidelines. This review is document in a 10 July 2002 white paper by Paul Cowley, the Forest Fish Biologist. The WCNF has authority and direction to implement some if not all of the actions identified the above documents 2 through 8, through cooperation with the Utah Division of Wildlife Resources and Wyoming Game and Fish. We also have provided input into activities relating to document 1. The Forest Plan, when approved, is expected to provide additional direction and conservation measures for reducing risks and threats. Item 8 will be implemented if alternative 7 is selected along with prescription categorie specific standards and guidelines.

Environmental Consequences

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Timber Harvesting.

The factor used to compare alternatives is the amount of land tentatively suitable for timber harvest and allowed (by prescription) across the forest. Timber harvest which is allowed in management prescription 3.1A, 3.1W and 3.2D is not included because it is assumed that actions would be carried out to meet aquatic habitat or watershed improvement/restoration purposes only and to implement a project that would impact these resources would not meet the objective of the prescription. The greatest potential impact as timber harvest occurs is from additional road construction that often requires stream crossings. This increases the potential for direct and indirect mortality to aquatic and semi-aquatic species. Direct mortalities occur, due to surface compaction, as roads are constructed through areas where frogs may hibernate. Eggs of both fish and amphibians are impacted as sediment from roads covers and suffocates them. Indirect impacts occur as concealment areas and shade is lost and water temperatures increase. Predators, because of increased access, may also find it easier to locate these species. Alternatives 4 and 5 have the greatest potential impact followed by Alternative 3, 7, 6, 2 and 1 in that order (Table AQ-5). Alternative 7 would have about the same level of impact as alternative 3 with 3.1 prescriptions being applied to all cutthroat trout populations.

Proposed standards and guidelines for location and design of timber harvest activities can reduce impacts to aquatic habitat. Guideline 3 limits percent of equivalent clearcut area based on stability ratings at the 7th HUC level. This should decrease the potential for excessive runoff and soil movement preventing sediment impacts described above. Guideline 4 maintains large woody debris naturally found in riparian zones after projects are implemented, thus protecting concealment areas and shade. Guideline 65 allows for the removal of trees, in other than suitable lands, for restoration activities. These are an important part of riparian habitat improvement where conifer cover can be removed to allow aspen regeneration with subsequent benefits to aquatic habitats from increased beaver activity.

Timber sale contract also provide additional, site-specific direction prior to implementing the projects.

Table AQ-5. Acres of the Wasatch-Cache National Forest, which are available for commercial timber harvest, vegetation treatments, road construction, wildland fire, use, the development of new recreational facilities and prescribed fire. Acreages are in thousands of acres (e.g., 122=122,000)

Activity	Alternatives						
	1	2(1)	3(1)	4	5	6(1)	7
Commercial Timber Harvest	0	122	336	757	754	162	393
Total Suitable Grazing Acres	278	252	300	300	300	288	286
Maximum Suitable Grazing Acres in Respect to Capable Grazing Acres (%)	75%	68%	76%	76%	76%	75%	75%
Vegetation Treatment	0	783	879	930	932	859	740
Acres Where Road Construction is Allowed	3	279	494	793	799	317	555
Wildland Fire Use	1,239	1,238	1,239	997	951	1,238	1,225
New Recreation Development	0	291	467	795	803	333	284
MPC 1.1-1.4	309	309	309	309	309	309	309
MPC 1.5	389	146	51	0	0	69	61
MPC 2.4	6	6	5	6	5	6	6
MPC 3.1 or 3.1A and W	138	182	159	106	70	186	190
total for above MPC	842	643	524	421	384	570	566

MPC=Management Prescription Category

(1) Road building numbers are less than shown as roadless areas are excluded from road construction.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Livestock Grazing.

Direct effects on aquatic and semi-aquatic species from *livestock* grazing include the trampling of eggs and juvenile fish. Cutthroat and rainbow trout eggs are in the gravel from mid May through mid August. There is sufficient overlap in the grazing season that direct mortality can occur as cattle and sheep cross through the streams. Indirect impacts can consist of loss of overhanging vegetative cover, loss of bank stability, increase sedimentation, and increases in temperature and stream width. Potential threats from grazing have been identified by “head

month use per mile of stream" in a sixth code HUC analysis (see FEIS Appendix B). Field observations validate that higher use levels do affect riparian habitat conditions. This information will assist in identifying the highest priority needs for revising allotment management plans from an aquatic habitat perspective. Additional adjustments may need to take place during allotment management planning to reduce threats and provide for the conservation of these aquatic and semi-aquatic species and to protect watershed conditions.

A number of measures can be taken to reduce the threats to aquatic and semi-aquatic species and their habitat from livestock grazing including changes in timing, season of use, and standards and guidelines for aquatic habitat. Steps taken to reduce potential threats in all alternatives through the Revised Forest Plan are: (1) the riparian class rating system used to set stubble heights recognizes the importance of conserving species-at-risk; (2) riparian class 1 requires a stubble height of 5 inches on key species and sets utilization standards for range in satisfactory condition; (3) in areas mapped with prescription 3.1A, grazing livestock must meet the standard for riparian Class 1 utilization; (4) a guideline to modify grazing practices that prevent attainment of desired future conditions for vegetation and/or aquatic resources. Site-specific desired conditions can also be developed.

The following are steps taken to reduce threats to aquatic and semi-aquatic habitats that vary by Alternative in this FEIS. Alternative 2 removes approximately 26,000 acres of 6th order watersheds within seven allotments (Blacks Fork, Gilbert Creek, Logan Canyon, Middle Fork, Poison Mountain, Walker and West Fork Smiths Fork) from the suitable range acres. These watershed have both existing populations of Colorado River or Bonneville cutthroat trout and at least 20 acres of riparian acres identified in the INFRA database as either estimated or verified as not meeting Forest Plan objectives. Livestock grazing would be removed from these areas for achievement of site-specific objectives developed to meet needs for these fish populations. Effects on aquatic habitats in these areas would be positive with full rehabilitation expected because livestock grazing could be removed from these large contiguous areas and riparian areas are known to improve relatively rapidly with exclusion of livestock grazing. No other alternatives remove entire portions of watersheds within allotments.

In Alternatives 1, 2, 3, and 6 about 2,100 acres of riparian habitat not meeting objectives are subtracted from suitable grazing acres to achieve rehabilitation of these areas. Rehabilitation of these areas will vary depending on effectiveness of herding, salting, and/or fencing of these areas to prevent livestock grazing. Effects on aquatic habitats would be positive with a range of results from full rehabilitation to slower and less consistent improvement in areas with difficult or expensive livestock management needs. Without site-specific information the exact improvement probability for each area is not known. In Alternative 7 only, rehabilitation of these riparian areas is achieved through implementation of a lower forage utilization allowance (30-40% rather than 50%) on the areas. This will require monitoring and movement of livestock upon reaching the lower utilization. Improvement of aquatic habitats would be more consistent overall than in Alternatives 1, 2, 6, and 3 because a lower utilization standard could be applied to all the areas more easily than total avoidance of the areas. However, even this approach's success will depend on diligence in herding, salting, range improvement maintenance, and monitoring of utilization. Alternatives 4 and 5 do not remove areas in unsatisfactory condition nor do they implement a lower forage utilization allowance for these areas. Some improvement of these areas is expected through implementation of management direction from the 1996 Rangeland Health Amendment, however it is expected that it would be more gradual and less

consistent than in any of the other Alternatives. Slow progress would be expected in rehabilitating unsatisfactory aquatic and semi-aquatic habitats.

Closure of vacant allotments provides long-term aquatic habitat benefits including maintenance of watersheds, and maintenance of ungrazed riparian habitat conditions for strongholds and benchmarks. The relative amount of aquatic and semi-aquatic habitats within vacant allotments defines the degree of benefit. Given that the Allotments are currently vacant, there is no immediate or direct effect on aquatic and semi-aquatic habitats from these allotment closures. It is also important to note that experienced budget levels in recent years have been inadequate to complete site-specific analyses on active allotments, making vacant allotments an even lower priority for analysis. Even in alternatives where vacant allotments are left open, it is highly unlikely that resources would be available to conduct the required site-specific analysis for re-introducing livestock grazing. Therefore, the short-term on-the-ground consequences of these alternatives would be similar to closure- i.e. the vacant allotments would remain in ungrazed condition. Given this, closure of vacant allotments is considered only as a long-term effect. Alternatives 1 and 2 provide the most long-term aquatic habitat benefits closing all vacant allotments. Alternative 7 provides somewhat less long-term benefits than 1 and 2 because it focuses closures only on Salt Lake and Davis County watersheds and on the three vacant allotments in the Eastern Uinta Mountians Management Area. Alternative 6 provides the long-term benefits for these three allotments but not for the other vacant allotment areas. Alternatives 3, 4, and 5 do not close vacant allotments thus not providing for long-term benefits although as explained above, short-term the allotments would likely continue to remain in ungrazed condition accruing those aquatic and semi-aquatic habitat benefits for the short-term.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Travel Management.

The greatest potential impact as travel management occurs is the form of additional public access, unauthorized road and trail development and road construction that often requires stream crossings. This increases the potential for direct and indirect mortality to aquatic and semi-aquatic species. Direct mortalities occur, due to surface compaction, as roads are constructed through areas where frogs may hibernate. Eggs of both fish and amphibians are impacted as sediment from roads covers and suffocates them. Indirect impacts occur as concealment areas and shade is lost and water temperatures increase. Predators, because of increased access, may also find it easier to locate these species.

The primary factor used to compare the alternatives is the area where road construction is allowed. It is recognized that the total additional miles of road to be constructed will be far less than what could be perceived by the use of acres where road construction is allowed. Alternative 1 has the least land available for road construction and would minimize the threats to aquatic species and their habitat. Alternatives, in order of least threat to greatest potential threat, are 1, 2, 6, 3, 7, 4 and 5 (Table AQ-5). Trail development is assumed to be similar to road construction in the degree of potential impacts. Alternative 1 has the fewest acres where new trails would be allowed and Alternative 5 has the greatest potential for new trails. Alternative 7 does provide additional benefits with only crossings being allowed in MPC 3.1A and a stronger emphasis on providing prescription direction for MPC 3.1A both inside and outside of roadless areas.

Under all alternatives it is assumed that efforts will be made to reduce impacts associated with existing roads. Alternative 2 is the most aggressive in restoring properly functioning conditions associated with existing roads.

Changes in amount, location, and design of trails and roads could allow recovery of riparian and stream channel functioning condition. Standards and guidelines that provide direction include: (S2) runoff will be controlled; (S3) unclassified roads and trails will be closed; (S4) sources of chemical and pathogenic pollutants will be stored correctly (this refers to oils and fuels used in heavy equipment); (S16) all decommissioned road/trails will be properly drained; (S19) new roads and trails will be constructed to minimize sediment discharge; (G4) beneficial volumes of large woody debris will be maintained in riparian areas; (G28) stream crossing will provide for desirable aquatic passage; (G40) effects from constructing roads and trails are to be minimized with regard to species-at-risk and their habitat; (G41) access routes will minimized impacts to riparian vegetation and in channel habitat; (G42) water supply points and supply points will be identified and controlled; and (G43) while grading roads, sidecasting will be minimized in order to reduce the amount of material entering the stream course.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Recreation Management.

The impacts from recreation are in the form of loss of riparian vegetation from bank trampling, bank destabilization, removal of large wood, and direct fuelwood harvest. This increases the potential for direct and indirect mortality to aquatic and semi-aquatic species. Direct mortalities occur as people are attracted to the waters edge to play, explore and fish. Eggs of both fish and amphibians are impacted as sediment from disturbed banks covers and suffocates them. Harvest of fish and amphibians also has a direct impact on populations. Indirect impacts occur as concealment areas and shade are lost and water temperatures increase.

Listed in order of increasing level of threat from potential recreational development are Alternatives 1, 7 and 2, 6, 3, 4, and 5. Alternative 1 has no new recreational facilities while two new facilities are allowed in the other alternatives. The major difference between alternatives is the differing number of acres where new facilities may be allowed (Table AQ-5). By limiting the acres where new facilities are allowed the potential impacts from the new facilities should also be limited.

With existing facilities, under all alternatives it is assumed that efforts will be made to reduce impacts from developed recreational facilities. This assumption is based on what has been accomplished over the last 15 years with a number of sites being moved away from the stream and concentrated closer to roads within developed sites. Alternative 2 is the most aggressive in reducing impacts to aquatic ecosystems. It is assumed, that some of the greatest threats to aquatic resources from recreation will come in the form of undeveloped recreation. As trailers are improved to carry increased volumes of water, with higher clearance and the public search for less urbanized setting, more people will be looking for area away from campgrounds to stay for extended periods. This is especially true as construction of new recreation facilities slows or stops.

Areas under special use permit can also have effects on aquatic resources depending on the degree to which they allow activities and facilities with direct and indirect effects on habitats. These vary in hydroelectric plants, ditches for irrigation withdrawals, ski resorts, and summer homes. Most of these impacts will continue in place. Alternative 4, implementing the 1985 Forest Plan provides the most restrictive and specific direction for special uses. Site-specific management plans and permit conditions will be the primary tools to provide protection of aquatic resources in these areas under other alternatives and the Revised Forest Plan.

Changes in amount, location and design of recreational facilities including campgrounds and trailheads may allow recovery of riparian and channel functioning condition. Excluding users from rehabilitated sites adjacent to streams and campgrounds is becoming increasingly difficult. Even with fences it is sometimes difficult to exclude the public from these areas. Standards and guidelines identified for the protection of aquatic resources include: (S19) new facilities will be constructed to minimize sediment discharge; (G4) beneficial volumes of large woody debris will be maintained in riparian areas; (G40) effects from constructing facilities are to be minimized to protect species-at-risk and their habitat; (G42) water supply points will be identified and controlled; (G48) facilities will be designed, constructed and operated to minimize adverse effects; and (G50) if riparian objectives cannot be met, the plan directs the period, type and location of use to be adjusted.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Vegetation Treatment (Excluding Timber Harvest and Wildland Fire Use and Prescribed Fire).

Vegetation treatments can have a positive or negative impact on aquatic systems depending on the treatment and how and under what conditions it is implemented. Treatments could include prescribed fire, thinning, seeding, and cut and scattering or cut and let lay vegetation. For aquatic systems this can have a positive affect by restoring properly functioning conditions in riparian zones across the forest. Although alternative 2 has fewer acres available for vegetation treatments than Alternatives 5, 4, 3, and 6 the focus would be directed more towards riparian restoration and not just fuels reduction which may be the emphasis in other alternatives. For aquatic ecosystems, Alternative 2 emphasizes restoration efforts for aquatic and terrestrial systems. The major treatment would be the removal of conifers in areas that were historically dominated by aspen. This would allow for beavers to re-colonize areas they historically used. Beaver have been identified as a management indicator species, which will allow for effectiveness monitoring of vegetation treatment in riparian habitat conservation areas. Alternative 2 is therefore identified as the most beneficial for aquatic resources. Alternatives, listed in order of greatest to least opportunity, or area available for vegetative treatment beneficial to aquatic species, are Alternatives 2, 5, 4, 3, 6, 7, and 1 (Table AQ-5).

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Oil and Gas Activities

(Note: The following description of effects relates only to the area identified as “the appeal settlement zone” as described in Topic 9. It is estimated to be about 68,300 acres).

The decision being made in the Forest Plan affects new leases only. No existing leases are affected. In all alternatives (except Alternative 4), 19,000 currently leased acres in the Table Top

Unit, could be explored with possible effects to soil and water resources. The degree to which exploration is predictable within the Table Top Unit is affected by whether or not new leases could be issued and what stipulations would be included in those leases.

Fish resources could be affected by the construction of access roads and well pads. Effects could be short-term decrease in fish productivity due to increased stream sediment loads from new crossings and road construction. All alternatives also carry some risk of direct mortality to fish if toxic materials are accidentally spilled into streams. The application of lease terms, stipulations and mitigation to protect water quality and riparian habitats reduce the risk of effects on fish habitat.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect aquatic and semi-aquatic species as a result of oil and gas exploration activities on an estimated 20 acres (Table OG-2). Impacts could be also result from oil and gas development on private minerals. As existing leases expire, lands would no longer be available for leasing and the threat to aquatic species would be reduced.

Alternative 2 is very similar to Alternative 1. Again, development of existing leases within the Table Top Unit could disturb about 20 acres (Table OG-2). Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining available acres, new leases could be issued but surface occupancy would not be allowed. The potential effects from new leases to aquatic and semi-aquatic species would not increase with this leasing option.

Alternative 3 precludes leasing in areas recommended for future wilderness designation in the future and does not allow new leases with surface occupancy in areas managed for undeveloped and backcountry recreation values and terrestrial habitat (see Prescriptions 2.6, 4.1, 4.2, and 3.2). Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,500 acres are available under Standard Lease Terms. Oil and gas activities are estimated to disturb about 75 acres (Table OG-2). Some of this development is predicted on existing leases within the Table Top Unit. Within the large areas that allow no surface occupancy, the effects to aquatic and semi-aquatic species are not increased; however, because this alternative allows occupancy on about 12,900 acres, the chances for adverse impacts are not totally eliminated.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to aquatic and semi-aquatic species are predicted.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to disturb about 105 acres (Table OG-2). Some of the effects could last 20-30 years because of field development. Standard Lease Terms include moving the site up to 200 meters (656 feet) if the site could be better located. This would allow for location outside the Riparian Habitat Conservation Area (RHCA). Although this leasing option appears to have the highest potential to result in adverse impacts to surface waters, compliance with the Clean Water Act and implementing State and Federal regulations is mandatory. This leasing option is the least restrictive and offers the greatest potential threat to aquatic and semi-aquatic species.

In Alternative 6 leasing availability is precluded in areas recommended for wilderness. In new leases issued as a result of the leasing decision made in the plan revision, surface occupancy is not allowed. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized recreation values and terrestrial habitat. Oil and gas activities are estimated to disturb about 75 acres (Table OG-2). Some of this development is predicted on existing leases within the Table Top Unit. In this alternative most areas are leased with no surface occupancy. In areas leased that allow surface occupancy, wetlands and riparian areas over 40 acres are protected in new leases with no surface occupancy so the effects to aquatic and semi-aquatic species are similar to Alternative 2. Leasing stipulations would also provide protection of stream environments.

Alternative 7 would preclude leasing on 20,400 acres recommended for wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb about 85 acres (Table OG-2). Areas associated with field development could be affected for 20-30 years. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Alternative 7 is the second least restrictive and offers a higher potential risk to aquatic and semi-aquatic species than most other alternatives. Oil and gas well pads would be required to be outside the Riparian Habitat Conservation Area (RHCA); however, the risk for adverse impacts would not be totally eliminated. Road crossings would also introduce additional risk to aquatic habitats.

Ranked by potential threats, alternative 4 would have the least threats followed by alternatives 1 and 2, 6, 3, 7, and 5 (Table AQ-7). Alternative 6 does allow surface occupancy on 3,600 acres where alternative 3 allows for surface occupancy on 12,900 acres, and thus alternative 3 poses a greater threat.

Effects from oil and gas activities will be reduced as standards and guidelines and followed. Standard 1 (S1) allow not surface occupancy on slopes greater than 40%. S2 applies runoff controls. S4 provides direction to reduce potential spills. S27 requires the Forest to follow the standard lease term of which some allow greater aquatic resource protection. G6 allows for the use of best management practices to meet water quality guidelines. G7 precludes soil-disturbing activities in wetlands or riparian area.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Fire Management Activities

Fire management activities include wildland fire use, prescribed fire and fire suppression. Wildland fire use is the allowing a naturally ignited fire to continue to burn when other resource goals are being met and the fire is within designated parameters. Prescribed fire is where the Forest Service ignites a fire to meet specific resource objectives and the burn takes place within designated parameters. Parameters, under which prescribed and wildland fires take place, are identified as part of the NEPA process on a site-specific basis and will provide the necessary levels of protection to preserve aquatic species. It is assumed that while in prescription aquatic

resources are protected. Both wildland fires and prescribed fires have been know to burn out of prescribed parameters and be reclassified as wild fires therefore the affects are treated as part of the affects of wildfire and fire suppression.

Effects from fire and fire suppression activities include direct mortality and indirect effects. Mortality can come from overheating the water to lethal levels, the dropping of retardant into water bodies causing death and the running of equipment through streams crushing eggs. Indirect effects range from dewatering eggs as water is siphoned for suppression efforts to increased sedimentation and debris flows.

During wild fires the greatest threats to aquatic ecosystems comes in the form of fire suppression activities and/or when a fire burns extremely hot causing the soil to become hydrophobic, and runoff potential increases. In an ideal world, if a fire were to start a resource specialist or specialists would be called in to provide information to the fire management team to help reduce impacts to all resources. A Forest-level fire management plan would be in place listing all of the objectives and standards and guidelines that would need to be followed to protect forest resources. Site-specific information would also be available to make good decisions. It is important to understand that this is not the case. History has shown that fire suppression activities can cause substantial aquatic damage. They range in impact from direct mortality, from air tanker slurry drops, to loss of riparian vegetation as camps are constructed adjacent to streams.

All alternatives are essentially the same in regards to wildland fire use with the exception of Alternative 5, which does not allow wildland fire use in MPC 5.2. The increase of wildland fire use should decrease the potential threats from wild fire and therefore threats from wild fire suppression actions. All alternatives are essentially equal with the exception of Alternative 5 as identified above.

Effects on Aquatic and Semi-aquatic Species and Their Habitat from Management Prescription Categories

Management prescriptions can reflect the direction and emphasis across the landscape. Emphasis of and activities allowed within the prescription can directly affect aquatic resources. It is assumed that if an activity is not allowed in an area there is less threat to aquatic species. (In aquatic environments, this assumption is not true in cases where species diversity has been altered by the stocking of fish in areas outside their historic range. In this case lack of action may cause addition threats to a population of historically present fish.) The more activities allowed in a management prescription, the greater the threat. Prescription emphasis and the standards and guidelines associated with a prescription may reduce threats from land management activities.

The prescription providing the greatest reduction in threats is 2.4, research natural areas. No timber harvest, vegetation treatments, road building, grazing or new recreation development is allowed. Prescriptions 1.1-1.5, wilderness and proposed wilderness, along with prescription 2.6, undeveloped areas, also provide a high level of threat reduction in excluding timber harvest, vegetation treatments, road construction and new developed recreation al facilities. Management prescription 3.1 also provides a high level of threat reduction. With the emphasis of the

prescription being on “protection, maintenance and or restoration of quality aquatic habitats, water shed conditions...” threats in this prescription should be significantly reduced.

To assess the affects of management prescriptions on aquatic species, the number of acres were summed for prescription categories 1.1-1.5, 2.4 and 3.1 and compared. Most of the acres gained in Alternative 1 are in proposed wilderness. Alternative 1 has the most acres in the combined prescriptions followed by Alternatives 2, 6, 7, 3, 4, and 5. Alternatives 2 and 7 also provide recognition for all populations of cutthroat trout.

Non-native Species and Other Threats

Additional threats also include non-native species, over utilization and accidents. Changes in fish stocking, treatment, and harvest limits are typically state actions. The Forest Service provides comments and may assist but leaves the general everyday fish management actions up to Wyoming Game and Fish and Utah Division of Wildlife Resources. Increased participation has come in these discussions and decisions through Regional Advisory Councils and conservation agreements and strategies for the Bonneville cutthroat trout, Colorado River cutthroat trout, and the spotted frog.

Nonnative species pose a threat to the aquatic species of the Wasatch-Cache National Forest. These include but are not limited to brook trout, rainbow trout, brown trout, *Myxosoma cerebralis* (whirling disease) and the New Zealand mud snail (*Potamopyrgus antipodarum*). These threats come in the form of competition for space and food, predation, interbreeding and crippling deformities.

Over utilization through scientific collections and harvest can also impact populations especially when combined with habitat lost and isolation of populations.

Accidents also have the potential to impact populations. These vary from vehicles going into stream channels along some of the major rivers, to flushing of water holding tanks with chemicals, to opening head gates on reservoirs and dropping water levels. All of these situations have occurred on or near the Forest. Little can be done about these threats through forest planning.

Fishery Enhancement

Fishery enhancement work ranges from altering channel configuration to fish interpretive signing. Other actions may include, but are not limited to, the installation of bank protection structures, pool formation structures, spawning gravel, fencing to exclude livestock, planting of riparian vegetation, installation of migration barriers to exclude exotic species and/or the chemical treatment of streams to remove non-native fish. It could also include the stocking of sterile fish versus reproductive fish. Some of these efforts are conducted by the states of Wyoming or Utah.

Construction and maintenance of barriers to prevent exotic species expansion and coordination with the State on aquatic species management could reduce potential impacts from exotic species. In an effort to reduce threats from non-native species, the State of Utah will now be

stocking with sterile rainbow or the appropriate subspecies of cutthroat trout (personal communication, Tom Pettengill, UDWR sport fish coordinator, March 13, 2001.) The state of Utah is also working to develop sterile brook trout for stocking. In some of the identified potential sites for expanding cutthroat trout populations (Table AQ-6), which receive a high level of recreational fish pressure and where cross breeding has not occurred, an alternative may be to shift to stocking sterile fish to meet the recreational demand and alter fishing regulations to provide greater conservation of the native population.

The potential to reduce threats and expand populations of native species is being addressed. The Forest Service has identified a number of areas where opportunities exist to coordinate with the states of Utah and Wyoming to expand native fish populations (personal communication with Paul Thompson, March 15, 2001)(Table AQ-6). The areas are located in a number of drainages. Alternative 2 identifies the greatest number of expansion areas for aquatic species that are mapped as 3.1 in the selected drainages. Alternative 6 and 7 would not recommend expansion into the Smith-Morehouse Drainage. Alternative 1 would be the most restrictive with the largest amount of recommended wilderness. Alternatives 3-5 do not identify streams recommended for population restoration. These alternatives, however, do not preclude restoration from occurring in any drainage. Most of the treatment and removal streams were identified in an effort to expand existing meta-populations. The exception to this is the South Fork of the Weber River. Currently a natural barrier exists on this stream that would allow a population to be established above this area.

Table AQ-6. Potential restoration area for Bonneville cutthroat trout by alternative.

Drainage	Stream	Alt. 2	Alt. 6	Alt.7
Hayden Fork	Hayden Fork Drainage	Yes	Yes	Yes
West Fork Bear	Whitney Reservoir	Yes	Yes	Yes
Logan River Drainage	Temple Fork	Yes	Yes	Yes
	Beaver Creek (1)	Yes	Yes	Yes
Ogden River	Causey Reservoir Tributaries	Yes	Yes	Yes
Weber River Drainage	South Fork Weber	Yes	Yes	Yes
	Smith-Morehouse Reservoir and above	Yes	No	No

(1) The majority of this work would need to be conducted on the Caribou National Forest in Idaho.

Cumulative and Viability Effects Summary.

Alternative 2 provides the best balance of protection and restoration opportunities for aquatic and semi-aquatic species (Table AQ-7). The individual ratings for Table AQ-7 are explained in the above narratives. Alternative 1 ranks out high as an alternative that provides for aquatic and semi-aquatic species but there are some difficulties in restoration efforts. Alternative 1 would make it very difficult to actively restore aspen stands adjacent to streams or to install migration barriers to preclude non-native fish because it depends entirely on natural processes. Alternatives 6 and 3 allow for restoration work but they provide less emphasis on aquatic restoration and protection. Alternatives 4 and 5 provide the least emphasis on protection of native aquatic and semi-aquatic species.

Table AQ-7. Ranking of Wasatch-Cache National Forest's alternatives by threats with 1 being least threat for aquatic and semi-aquatic species and 7 being greatest threat. If two or more alternatives are equal the ranking were averaged.

Potential threats affected by Wasatch-Cache NF management	Ranking of effects, compared to current, from changes by alternative						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	*Alt 7*
Timber	1	2	5	6.5	6.5	3	4
Grazing	2	1	4.5	6.5	6.5	4.5	3
Travel Management	1	3	5	6	7	4	2
Recreation Management	1	2	5	6	7	3	4
Special Uses	4.5	4.5	4.5	1	4.5	4.5	4.5
Vegetation Treatment (excluding fish and timber action)	6	1	4	3	2	5	7
Oil and Gas	2.5	2.5	5	1	7	4	6
Fire Management Activities	3.5	3.5	3.5	3.5	7	3.5	3.5
Management Prescription	1	2	5	6	7	3	4
Fish Enhancement	5.5	1	5.5	5.5	5.5	2.5	2.5
Overall average	2.8	2.3	4.7	4.5	6.0	3.7	4.1

The viability assessment for native fish (Appendix B and summarized above), with emphasis on the Bonneville cutthroat trout and Colorado cutthroat trout, indicates that the native fish species are expected to persist on the WCNF for the next 100 years even under current risks and threats (Alternative 4). Comparison across alternatives is, therefore, based on the effects and cumulative effects analysis presented above, including the differences in the level of threats that would be addressed under each alternative, as presented in Table AQ-7. The overall average is used to provide a sense of difference between alternatives. No weighing of individual threats has been done because any one factor could be sufficient to cause the loss of a population. The difference in effects on viability would therefore be the same as identified above for cumulative effects. All of the Alternatives, except Alternative 5, would result in either a similar to or at reduced levels of threats and would therefore result in continued persistence of the species.

Of these, Alternative 2 would be expected to provide the most beneficial effect to the viability of the species, followed by Alternatives 1, 6, 7, 3, and 4, in that order. Alternative 5 would result in an increase over the current level in risks and threats to the populations. Persistence is possible under Alternative 5, but the potential for losses of species is greatest due to the greatest potential for threats to populations and their metapopulations.

It is important to recognize that the threats identified in Table AQ-7 are merely a ranking and not absolute numbers. A ranking of 6 in the grazing row is not equally equated to a ranking of 6 in the recreation row. It should also be recognized that the threat differences between rankings of 1 to 2 in grazing may be significantly different than the threat difference between a ranking of 2 to 3. The rankings are just that, a ranking.

The standards, guidelines, and monitoring and implementation measures that were developed for the Revised Plan to minimize risks and threats for species viability have been identified (Table AQ-8), as previously discussed in the effects discussions with the exception of general protection as identified below. These include standards pertaining to watershed health.

Table AQ-8. Standards and Guidelines in the Revised Plan Pertaining to Threats

Threat	Reference #
Timber Harvest	G3, G4, G65, G3.1A1,
Domestic Livestock Grazing	S23, S24, G67, G71, G72, G3.1A2
Travel Management	S2, S3, S4, S16, S19, G4, G28, G40, G41, G42, G43, G3.1A3
Recreation Management	S19, G4, G40, G42, G48, G50, S3.1A1, S3.1A2, G3.1A3, G3.1A4
Oil and Gas Activities	S1, S2, S4, S27, G6, G7
Fire Management	G35, G3.1A1, Wasatch-Cache Fire Management Plan.

Topic 3 – Roads Access Management

Introduction

Transportation facilities are essential in providing access to and through the Forest. They provide access for administration and for Forest visitors for recreation, driving for pleasure, hunting and fishing and economical livelihood use. Most of the transportation system is in place and generally appears to be serving the Forest well. The Forest Plan will provide a framework for an efficient and environmentally sensitive system for future Forest needs.

This topic addresses the general conditions of roads and current access to the Forest. It is closely related to Topic 4 – Recreation. Further information about recreation-related travel can be found there.

Laws, Policy, and Direction

- The **National Forest System Road Management and Transportation System; Final Rule and Policy**, approved January 12, 2001, provides direction for a road system that is safe, responsive to public needs, environmentally sound, and affordable and efficient to manage. The purpose is to help ensure that additions to the National Forest System network of roads are those deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impact; and that unneeded roads are decommissioned and restored.
- The **Roadless Area Conservation Rule.** January 12, 2001, prohibits road construction and reconstruction in inventoried roadless areas on National Forest System lands, unless certain exceptions are met.
- **36 CFR Part 212**. Administration of the Forest Transportation System.
- **Forest Service Manual (FSM) 7700**. Transportation Systems.
- **Forest Service Handbook (FSH) 7709**. Transportation and Related Activities.
- **Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (**USDA Forest Service 1999), is an integrated ecological, social and economic approach to transportation planning based on science that provides a process to analyze existing and future road needs and management.

Affected Environment

Travel Management

Travel management is the integrated planning of and providing for the movement of people and products to and through Forest lands. A travel management plan provides clear, specific direction on the appropriate levels of access to the Forest to be made available and the forms of transportation this access will take.

Travel management planning is critical for the management of Forest infrastructure and public access needs. At one time, many roads on the Forest were constructed for commodity needs such as timber production, mining and special use access, and range management. Although access is still needed for these purposes, access for recreational purposes are now the highest use of roads.

Traditional forms of recreation travel, such as driving for pleasure, hiking and horseback riding are showing steady increases. The popularity of mountain biking, snowmobiling, all-terrain vehicles and cross-country skiing have grown as well as other newer forms of travel such as hang-gliding, skateboards, trail skates, and dog sleds. Lakes and reservoirs receive a variety of uses such as motorboats, canoes, personal watercraft, and wind surfers.

The current Forest plan directs the development of travel plans to manage off-road vehicle use to protect resource values and to resolve recreation conflicts. Project level travel management planning can also be used to reduce undesirable road density levels. Travel management is an ongoing process that goes beyond the Forest planning stage. As travel management plans are amended, site-specific direction will be needed in some areas.

Travel management addresses more than the simple opening and closing of roads and areas to motorized use. A number of complex travel and access issues are involved in travel management:

- Recreation uses and impacts
- Legal public access to Forest lands
- Legal public access to private inholdings
- Closed versus open policy
- Economics of transporting commodities
- Law enforcement
- Public health and safety
- Travelway maintenance costs
- Effects and impacts on other Forest resources

Each District on the Wasatch-Cache has an approved current travel management plan. Travel plans are updated periodically by the Districts and involve public input, an Environmental Assessment, and an appealable decision. Routes and areas that are designated open to different types of vehicles (OHV, ATV, snowmobile, motorcycle) vary by location and season and are listed on the district travel plans. Revised travel plans will show specific areas open to snowmobiles and routes open to mechanical use (i.e. mountain bikes). The status of these vary by District:

- Salt Lake – 1997 (mainly includes allowed motorized trail use)
- Kamas – 1995
- Evanston/Mountain View – 1988 (currently being revised)
- Ogden – 1991 (updated in 1997 for minor changes)
- Logan – 1991 (updated in 1997 for minor changes)

Recreation-related travel on the WCNF has increased in volume and will continue to do so. They are affected by technological advances; economic conditions; changing demands for recreational experiences, population increases and other social influences. Worthy of note is the rapid increase in use of mountain bikes and OHV's. Growth has increased in sections of the Forest located near urban populations.

Recreation-related travel stands out as a significant issue. Recreational conflicts occur on the Forest because of increased use on the Forest and different needs of users. Areas that were once used by only a few users of one type, now face crowded conditions with several different types of users present. A key concern is the perceived incompatibility of various modes of travel. Non-motorized recreationists view their experience to be degraded by the presence of motor vehicles. They are finding it more difficult to find areas outside of wilderness that are free of motorized use.

Mountain biking has increased at a fast rate and current travel management has few restrictions on mountain biking, except in wilderness and research natural areas. Complaints about bikes from hikers and horseback riders have increased. At the same time, bicyclists would like to see more trails specifically designed and managed for mountain biking.

Motorized recreation users express frustrations on more limited areas to use and greater restrictions and regulations. They feel there is more than ample opportunity for non-motorized users with land already designated wilderness or non-motorized and are concerned that future management could further reduce motorized access. Some recreationists have expressed a desire for uses to be separated or at least to have some areas designated in which other uses are not permitted.

In the future, there will be increased use from other user groups such as senior citizens, minorities, and the physically challenged. These other visitors may have different recreation and access needs.

The increased urbanization of lands adjacent to the Forest has led to the closing or impairment of several traditional access routes. This is especially true for routes near areas like the urbanized Wasatch Front.

Evident resource damage attests to unauthorized off-road travel by motorized vehicles in some areas. These violations occur yearlong, but peak during the fall hunting season. Resource damage is especially critical if it occurs in watersheds, highly erosive soil, and key wildlife areas. There are trespass problems by motorized vehicles in wilderness areas, including snowmobiles during the winter. Vandalism and destruction of signs and barricades meant to enforce travel plans is a problem in some areas of the Forest.

Roads Management

A road is a motor vehicle route more than 50 inches wide, unless designated and managed as a trail. There has been a steady increase in road miles in the Forest Service since the 1940's. Some of that increase is due to better inventorying and classifying of existing roads. Many of the

roads were constructed to support timber harvest activities, as well as other commodity uses (mining, grazing, special uses). Today, recreation is the largest single use of National Forest System roads, accounting for the majority of the use on them.

Roads can have both beneficial and negative effects. Roads provide access for multiple uses, access to private lands, and firebreaks, and if properly constructed can mitigate negative effects of past roading. They can have undesired effects on hydrology, sedimentation, source of human-caused fires, habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogen, some recreational experiences, water quality and chemical contamination, soil productivity and biodiversity (Forest Service Roadless Area Conservation FEIS, 2000).

Roads management is an important aspect of Forest management on the Wasatch-Cache NF. Most of the administrative, commercial and public travel on the Forest occurs on roads. The Forest transportation system contains about 1,500 miles of forest roads under Forest Service jurisdiction that provide access to and through National Forest System lands. These include two-track roads that are planned for closure. Roads that are under municipal, county, and state jurisdiction or private roads that provide access to the Forest complete the transportation network. Forest roads are authorized primarily for the administration, protection, and utilization of National Forest lands. Through travel management planning, public access opportunities on roads are provided, along with the controls and restrictions necessary to achieve specific land management objectives and direction.

The extent of the road system varies by management area. The Western Uintas, Eastern Uintas, and Cache-Box Elder management areas have the largest mileage of District travel plan roads, while the Central Wasatch Management Area has the fewest travel plan road miles. Management areas that are smaller in size and have a high amount of wilderness and roadless acreage tend to have fewer roads.

Table RM-1. Management areas and their associated size and miles of road found within the area.

Management Area	Size (acres)	Total Forest Service Road (miles[1])	Private Roads (miles)	County Roads (miles)	State Roads (miles)	Other Federal Roads (miles)
Bear	52,251	115				
Cache – Box Elder	288,173	307				
Central Wasatch	97,543	92				
Eastern Uintas	306,167	370				
North Wasatch – Ogden Valley	142,193	162				
Stansbury	68,931	42				
Western Uintas	280,670	419				
Forest-wide [2]		1506	25	20	84	37

[1] This does not include the Federal, State or County roads which may be found in the Management area.
[2] Forest-wide miles of road do not include Forest Service access roads located outside of the management areas.

A road might be classified, unclassified, or temporary. Classified roads are those needed for motor vehicle access, authorized by the Forest Service, and intended for long-term use. They include state, county, private, and National Forest system roads. Temporary roads are authorized by contract, permit, lease or emergency operation, not intended to be part of the NFS transportation system and not necessary for long term resource management. Unclassified roads are unplanned roads, abandoned travel ways and off-road vehicle tracks, which have not been designated and managed as a trail. In the past, these unclassified roads were termed “temporary”, “pioneer”, “ghost”, “ways”, and “two-track” roads. Several of these roads were added to the Forest inventory in 1993 to assist in road management and so their future decommissioning could be carried out in a planned manner. With insufficient budgets enforcement, decommissioning, and restoration of these roads has been limited.

Road Management Objectives

Road Management Objectives (RMO) are established for all classified roads and provide criteria for design, operation and management of the road. Design standards such as number of lanes, lane width, surface type, vehicle types, expected traffic volumes dictate management standards including functional class, traffic service levels and maintenance level. Access needs, environmental constraints, and economics are considered when determining the appropriate standards to be applied.

Functional Class. Forest roads provide access in a branching system of arterial, collector, and local roads. Arterials provide access to large land areas, typically by linking to county roads, state highways, or communities. They have the highest standards for construction and maintenance, because of a larger volume of traffic they carry. Collector roads disperse traffic from arterials to large forest areas, such as watersheds. Local roads used to access specific project areas or sites are usually short roads of a lower standard of construction.

Table RM-2. Miles of Road by Function Class

Functional Class	Miles
Arterial	21
Collector	243
Local	1,341

Source: Forest Service INFRA Database.

Traffic Service Levels. Traffic service levels represent the significant traffic characteristics and operating conditions for a road: Level A (most efficient and free-flowing) through D (single purpose, low volume).

Table RM-3. Miles of Road by Traffic Service Level

Traffic Service Level	Miles
A	19
B	150
C	923
D	511

Source: Forest Service INFRA Database

Surface Type. The surface type of the road represents the material placed on the road template, which the vehicle tires are in contact with. Different surface types are utilized to provide an efficient transportation system in terms of use, maintenance level, traffic service level and maintenance costs. Table RM-4 shows miles of road by surface type.

Table RM-4. Miles of Road by Surface Type

Surface Type	Miles of Road
Asphalt	55
Bituminous Surface Treated	16
Crushed Aggregate or Gravel	143
Improved Native Material	226
Native Material	1,165

Maintenance Levels. Road maintenance levels prescribe the upkeep and restoration work necessary to retain a desired service level. Maintenance levels are divided into operational maintenance levels and objective maintenance level. Operational ML describes the existing condition of the road in terms of current maintenance activities. Objective ML prescribe the upkeep and restoration work necessary to retain a desired service level. Level 1 maintenance is the lowest standard and is used to close roads from motor vehicle traffic, while preserving the investment in the road structure. Level 2 through 5 are maintenance levels for roads open to full-sized motor vehicle traffic. Level 2 is used for high-clearance vehicles, such as trucks and four-wheel drive vehicles. User comfort improves as the maintenance level increases up to level 5, which is a road with a paved smooth surface.

Table RM-5. Miles of Road by Operational and Objective Maintenance Level

Maintenance Level	Objective (Miles)	Operational (Miles)
1	27	75
2	903	1069
3	499	368
4	74	39
5	102	54

Source: Forest Service INFRA Database

Road Maintenance and Decommissioning

As a result of road maintenance budgets not keeping up with inflation and road deterioration, the condition of many roads on the Forest has fallen below the levels necessary for resource protection and to efficiently support the traffic volumes being carried. Commercial user contributions, because of fewer activities like timber sales, have decreased in recent years. Several county roads that provide access to the Forest are substandard. County governments continue to provide maintenance on some Forest roads, but at reduced levels. Trends indicate that increased volumes in the future; especially from recreation-oriented traffic will continue.

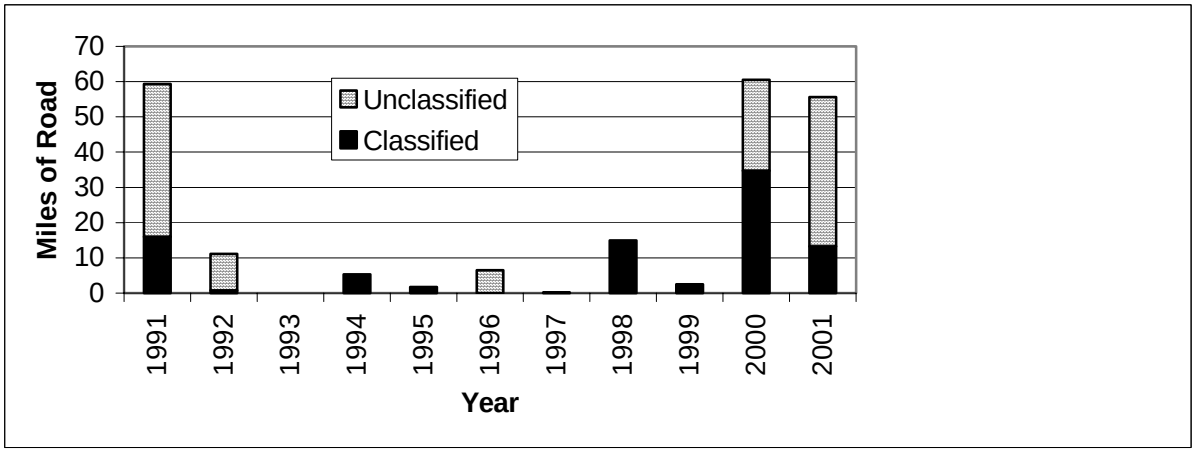
With road maintenance budgets not keeping pace with inflation and road deterioration and traffic volumes on the Forest road system dramatically increasing, many roads have not been maintained to the levels prescribed in management objectives. Maintenance on roads is

expensive, with new roads costing, on average, approximately $1,500 per mile annually. In FY 2000, the Forest Service received about 30% of the estimated funding needed to maintain its existing road infrastructure. Annual accomplishment reporting indicates that the Wasatch-Cache road maintenance program has achieved maintenance on approximately 23% of the transportation system. This means that a large number of miles of road are in a deteriorating condition and are causing resource damage, especially because of erosion control problems. Many are rutted and rough and barely usable. Road maintenance activities have been mainly focused on stabilizing and removing public safety hazards on Forest roads.

To address the declining ability of the Forest to provide adequate maintenance and restoration work, physical closures to motor vehicles (Maintenance Level 1) and road obliteration have been employed to an increasing degree. There has not been adequate funding to decommission unclassified roads at more than a few miles per year. Decommissioning a road usually includes stabilization, restoration or conversion of an existing roadbed to a more natural state. A number of these unclassified roads are user created roads. Reporting of roads decommissioned started in 1991 and since then an average of 20 miles of road per year have been obliterated. This includes 90 miles of classified FSRs and 128 miles of unclassified roads on the Forest. Figure 1 shows miles of classified and unclassified roads decommissioned per year since 1991 as reported in annual accomplishment reports. The cost to decommission a road varies greatly by the standard and location of the road as well as the level of needed treatments. Cost estimates should be based on a case-by-case basis.

Many local roads are primitive, poorly located and difficult or impossible to maintain. They are continuing to deteriorate, cause resource damage and become safety hazards and many need reconstruction. Non-system travelways are usually not necessary for administration of NFS lands or access to them. Many of these routes are old timber, range or mining roads that may or may not have been altered to eliminate vehicular traffic. Others have been created by unapproved recreational use. Because many of these ways appear on the landscape as a road and in many cases cause resource damage, there is a need to monitor their use and condition and close them as soon as funding allows.

Figure RM-1. Roads decommissioned on the Wasatch-Cache National Forest from 1991 to 2001.



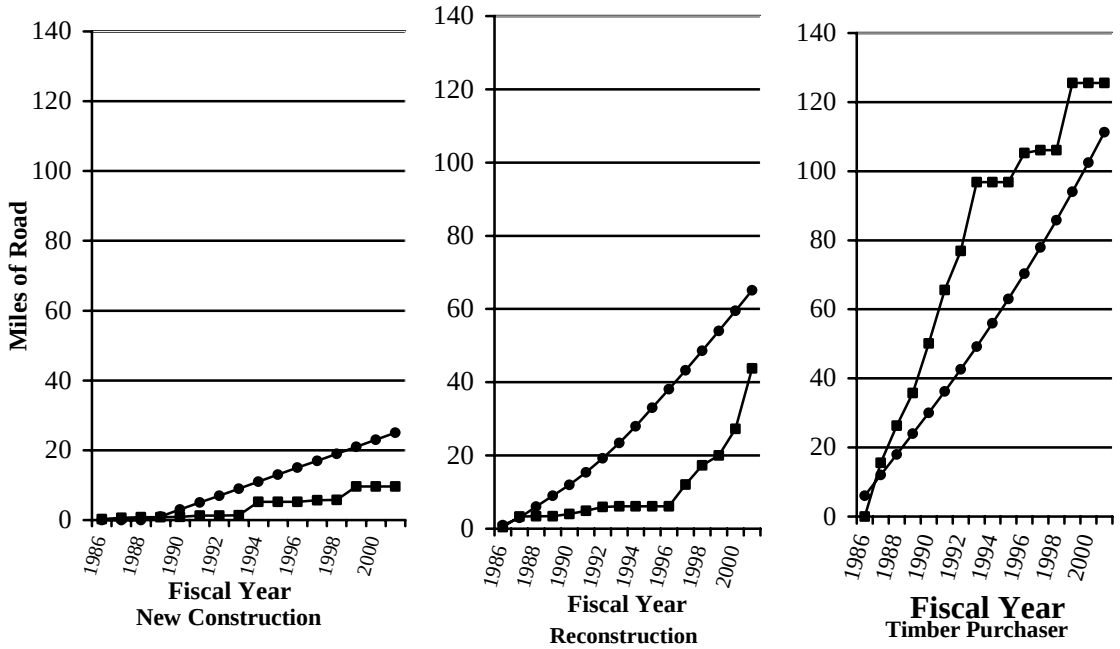
Roads decommissioned include classified and unclassified roads. This chart may include roads where the use has been converted to trails. It may also include roads that have been decommissioned as a road has been rerouted to minimize environmental damage such as the Temple Fork Road.

Public scoping has shown that many of these travelways are of interest and value to some Forest users. Some of the public wants them kept open (or re-opened) for motorized and mechanized recreation and access, while others want them closed to protect roadless, non-motorized recreation, wildlife and watershed values. As these routes are located and inventoried, management objectives for them need to be developed. In many cases, the objective will be to eliminate the route by obliteration and revegetation.

Road Construction and Reconstruction

The current plan had miles of new roads construction and reconstruction planned on the Forest. Primarily, because of reductions in the timber sale program and lower than expected appropriations for capital investments, many of these roads were never constructed or reconstructed. Over the past decade, road construction has declined significantly. Since 1986, there have been 48 miles of road constructed and 214 miles of road reconstructed. Road reconstruction and realignment is intended to improve water quality, provide wildlife security areas, and create an efficient transportation system.

Figure RM-2. Road improvements as projected in the 1985 Wasatch-Cache National Forest Plan (—●—) compared to the actual improvement completed (—®—) on the Forest for the year 1986 through 2002.



Road Density

The 1985 plan states road density levels will be established for management areas based on criteria such as public safety, excessive soil loss or water quality degradation, conflict with wildlife habitat use, roads not needed for resource management, protection of visual quality, returning area to forest production, reducing user conflicts, reducing maintenance costs, and providing diverse opportunities for non-motorized recreation. As a result of establishing density levels, roads were to be closed, further evaluated or left open. In some cases on the Forest, actual densities inventoried during project planning were found to be much higher than the maximums presented in the 1985 Plan. Some areas identified in 1985 as too high in road density, still have undesirable road densities (Wasatch – Cache Preliminary Analysis of the Management Situation, 1999). Travel Management planning has been the approach for evaluating these on a case-by-case basis for retaining or decommissioning.

Revised Statute 2477

It is believed there are few Revised Statute (RS) 2477 roads on the Forest. These roads are public ways constructed across public lands prior to the date of National Forest reservation, have some form of construction, and have been used as a public highway. The Forest Service does not have a definitive regulatory mechanism by which it can administratively recognize public roads under RS 2477. Only a legal determination usually through a court action can actually establish an RS 2477 right-of-way.

Roads Analysis

In January of 2001, the Chief of the Forest Service approved a new road policy that uses a science-based forest transportation system that meets the needs of the public yet minimizes or reverses the environmental impacts often caused by roads. The new policy is aimed at providing managers tools to make better more informed decisions about where, when and if new roads should be constructed, to close or decommission old unneeded and unauthorized ghost roads; to upgrade forest roads as appropriate, to meet changing uses, local communities access needs and growing recreation demands and to identify sustainable funding sources for maintaining forest roads system.

Interim directive 7710-2001-3 of the Forest Service Manual provides managers direction for completing the roads analysis. It relies on the Forest Service report called *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System* (USDA Forest Service 1999). Roads analysis is an integrated ecological, social, and economic science-based approach to transportation planning that addresses existing and future road management options.

A Roads Analysis of the forest's higher standard roads, Maintenance Objective Levels 3-5, was completed during the winter of 2002. Identification of potential environmental risks and benefits for individual road segments will be helpful in prioritizing future watershed analysis or other site-specific analysis of the transportation system. A more detailed description of the analysis

process followed can be found in FEIS Appendix B-5. The complete report is posted on the forest website at www.fs.fed.us/wcnf.

Scenic Byways and Backways

Several US and State Highways, as well as County roads access the Forest. There are several designated Forest Service scenic byways and backways on the Wasatch-Cache:

Table RM-6. Scenic Byways and Backways on the Wasatch-Cache National Forest

Name	Number	Type
Logan Canyon	US 89	Byway
Ogden River	Utah 39	Byway
Big Cottonwood	Utah 152	Byway
Little Cottonwood	Utah 210	Byway
Mirror Lake	Utah 150	Byway
Skyline Drive	FS Roads 007, 008 and 167	Backway
Trapper Loop	Utah 167	Backway
Willard Peak	FS Road 084	Backway
Hardware Ranch	Utah 242	Backway
South Willow	FS 171	Backway
Guardsman Pass	Utah 224	Backway
Pioneer Memorial	Utah 65	Backway
North Slope	FS Roads 058 and 072	Backway
Broadhead Meadow	FS Road 416	Backway

Source: Forest Service GIS Database.

Environmental Consequences

General Effects

Road construction and reconstruction are usually associated with timber harvest, utility lines, mineral and energy development, recreation facilities, and public safety. Most of the Forest road needs for the current level of use are in place. Reconstruction, maintenance, and decommissioning of existing facilities are expected in all alternatives. Projections for new construction are much lower than was predicted for the previous planning period. Commercial use of the transportation system has declined in the 1990s and this trend is expected to continue in the coming decade. On the other hand, recreation traffic has increased substantially. This shift in traffic composition and user types is a driving force for development of new travel management philosophies and strategies.

New standards and guidelines have been developed to mitigate the impacts on natural resources resulting from the current road system and its increased use. Nationally, the trend in the 1990s has been to redirect maintenance funding to decommission unneeded roads and improve the maintenance conditions of those remaining. A smaller, more efficient transportation system is the expected outcome.

Even though the total overall miles of roads do not change significantly by alternatives, the management prescriptions assigned to areas may affect some future road management objectives for specific areas. An example of this would be within a Prescription 3.2D, after completion of vegetation treatment projects to improve terrestrial habitat, whether or not roads remain open will depend on the overall road density and specific wildlife management needs in the area. Maintenance effects are the same for all alternatives based on experienced budget levels. Roads are usually maintained on a priority basis with items like user safety, resource protection, and user comfort needs used to prioritize roads for maintenance. Road maintenance will probably remain below full capacity based on those budgets, but it is hoped that it will improve over current levels, because of the emphasis nationally on environmental effects caused by roads and needed maintenance to reduce those effects.

Travel Management Planning

Presently, travel management across the Forest is identified in District travel plans. These travel plans remain in effect until they are revised based on site-specific analysis including public involvement. The final decision for plan revision could have some effects on travel management planning. This includes potential road management changes based on management prescriptions as described in the example above.

Public comments and discussions after review and comment on the DEIS revealed needs for updating some District Travel Plans, particularly Ogden, Salt Lake, and Logan Ranger Districts. Given this need an Objective was developed and included in the Revised Forest Plan to complete this work in the near future. Changes resulting from these site-specific Travel Planning analyses may require Forest Plan amendment, particularly if they affect Recreation Opportunity Class mapping. This is an expected and appropriate type of adaptation of the Plan to changes in the future.

The Revised Forest Plan provides implementation guidance for travel management planning in the form of criteria and considerations to be used during updates. Site-specific issues to be addressed in future travel planning could include seasonal road closures, wildlife and fisheries habitat needs, undeveloped recreation site access, resolution of user conflicts, designated OHV routes, and/or mountain biking routes.

Comments on the DEIS also raised questions about how Recreation Opportunity Spectrum mapping was intended to be used in the future when Travel Management Plans are updated. People wanted to know whether a mapped ROS Class such as Semi-Primitive Non-Motorized would preclude consideration of additional motorized routes in that area, for example to develop a loop between existing motorized routes. Likewise, people asked if an area is mapped as Semi-Primitive Motorized because of an existing motorized trail, would that trail be precluded from consideration for closure and return to non-motorized status because of the ROS Class. These excellent questions resulted in re-examination of how ROS was to be used and what its relationship is to Travel Management Planning. Our conclusion was this: ROS Maps will provide direction for managing recreation settings *until such time that Travel Management Plans are updated through site-specific analysis*. As Travel Plans are updated, that analysis can

include alternatives that would require amendment of the Forest Plan ROS Maps. In other words, *ROS Mapping necessarily follows Travel Management Plan updates*, rather than preceding them or precluding certain changes to them. This ensures that a range of options can be considered at the site-specific level which is the appropriate scale for decision making on designated open travel routes.

Open road densities are defined by current District travel plans. Generally road density stays the same in alternatives for most areas, except for slight decreases, where there are roadless areas recommended for wilderness and slight increases, where there would be roads constructed for timber harvest or oil and gas exploration and development in roadless areas. Disposition of roads after use for these purposes needs to be decided in site-specific analyses and will be tied to Management Prescriptions.

Results of Roads Analysis

As stated earlier the Wasatch-Cache, using the roads analysis process, conducted an analysis of roads with a Maintenance Objective level of 3, 4, and 5. This process resulted in recommendations, not decisions. Roads were evaluated with consideration of their "costs" and "benefits". Costs were defined as environmental threats to resources such as water quality, riparian habitat, terrestrial species and aquatic species. Of the 423 road segments analyzed, 28 segments or 13.0 miles of road had insufficient information to identify environmental risks. Seventy-five road segments or 77.8 miles of road were identified as having a low environmental risk. Two hundred segments or 357.1 miles of road were identified as moderate environmental risk. One hundred and twenty road segments or 179.2 miles of road were identified as having high environmental risks.

Benefits were defined as providing public, private or administrative access and maintenance costs. No road segments were identified as being low benefit based on the above criteria. This finding was likely given that the roads analyzed were of higher maintenance objective levels. One hundred and sixty two road segments or 131.1 miles of road were identified as having moderate benefits. Two hundred and sixty one road segments or 496.1 miles of road were identified as having high benefits.

By comparing the cost and benefit relationship for a road segment, the initial forest wide review suggests that 275 road segments or 434.9 miles of road should be retained. No roads segments of maintenance level 3, 4, or 5 were initially identified for potential decommissioning. Site-specific analysis will be required to validate these findings.

Effects on Roads/Access Management from Inventoried Roadless Area Management

Direct and Indirect Effects

Roads and access management are affected in several different ways from management of inventoried roadless areas. Because recommended wilderness does not allow mechanized or motorized use, access for these uses on currently open roads and trails within areas

recommended for wilderness would be eliminated. Alternative 1 has 2.3 miles of system travel plan roads that would be closed as a result of inventoried roadless areas being recommended for Wilderness designation (1.9 miles in Lakes and 0.4 miles in Stansbury roadless areas). All other alternatives have no system travel plan roads in recommended wilderness areas and therefore no road closures would result from wilderness recommendations.

Alternatives 1 would be the most restrictive on motorized access on trails in roadless areas recommended for wilderness. Alternative 1 would affect about 76 miles of motorized trails in roadless areas recommended for wilderness. Alternative 2 would affect about 7 miles of motorized trails in roadless areas recommended for wilderness, Alternatives 3, 6 and 7 have no motorized trails in roadless recommended for wilderness. There would be no displacement of motorized recreation users because no wilderness recommended in alternatives 4 and 5. Mountain bike use is not allowed in wilderness or recommended wilderness. Alternative 1 has the most miles of trail currently open to mountain bikes that are in recommended wilderness at 167 miles, followed by alternatives 2, 7, 6, and 3. Alternatives 4 and 5 with no recommended wilderness should have no effects on mountain biking.

The Forest Service Roadless Area Conservation Rule would have an effect on road construction and reconstruction. Alternatives 1, 2, and 6 incorporate this rule. The direct effect of the rule in these alternatives is that roadless dependent values in inventoried roadless areas would receive protection and management emphasis. It could preclude new road access (not trail) within these areas to forest resources such as timber, minerals, and additional motorized recreation opportunities.

Under the Roadless Area Conservation Rule, no new road construction or reconstruction would be permitted within Inventoried Roadless areas without one or more of the following exceptions:

- To protect health and safety threatened by a catastrophic event;
- To conduct environmental cleanup,
- To provide for statutory or treaty rights;
- To prevent irreparable resource damage;
- To rectify existing hazardous road conditions; or
- A road is part of a Federal Aid Highway project.

Effects on Roads/Access Management from Recreation

Access that is safe and convenient to the Forest Visitor is critical to ensure a positive recreation experience. Recreation use will continue to increase as the population growth along the Wasatch Front continues and along with that, the use of forest roads will also increase. Arterial and major collector roads that connect the forest will experience increased day-use traffic especially on weekends. This traffic will add to the maintenance necessary to keep the roads in a safe and structurally sound condition.

In alternatives 3 and 5, roads constructed from timber harvest could be left open after the harvest to maximize access for recreation. Roads could also be left open in alternative 4, but other roads would have to be decommissioned to maintain current road densities. Roads being considered for

decommissioning in future travel planning decisions can be evaluated on a site-specific basis to see if they could be converted to meet motorized and non-motorized trail needs.
New road construction is not allowed in Alternative 1. For Alternatives 2 to 7, new road construction for recreation purposes is expected to be very low and not vary much by alternative. It is anticipated that some reconstruction will occur, but it will be minimal, since most of the infrastructure in is place. Road operation and maintenance activities will continue to be essential in providing safe and convenient transportation facilities.

An adequate budget to support road maintenance will continue to be a challenge. Paved roads provide access to many campgrounds and cost $10,000 to $15,000 per mile to maintain. For most roads in the Forest, road damage occurs in the spring from recreational driving and in the fall from hunting activities, when wet weather conditions often saturate road surfaces.

Effects on Roads/Access Management from Timber Harvest

Alternatives with higher amounts of timber harvest would have greater amounts of new road construction. Alternative 1 would have no new roads constructed for timber harvest. Alternatives 2, and 6 would have about 6 and Alternative 7 would have about 7 miles of new roads constructed for timber harvest. Alternative 3 would require about 39 miles of road constructed for timber harvest, while alternatives 4 and 5 would require the most new roads at about 49 miles. Given that the current budget levels for roads maintenance are not equal to the needs for the already existing road system, new roads would to the maintenance backlog. Indirect effects of timber harvest include additional access provided for other Forest activities such as recreation uses, management of livestock grazing, and fire suppression. Also funds generated through timber sales may be used to decommission unneeded roads within the sale area.

Effects on Roads/Access Management from Oil and Gas Activities

Road construction is often associated with mineral and energy exploration and development activities. Limited road construction for these activities is anticipated for all the alternatives. Oil and gas exploration and development activities would require some road construction and reconstruction. Alternative 4 would have no new roads constructed because no leasing decision would be made. Alternatives 1 and 2 project 3 miles, Alternatives 3 and 6 project 6 miles and, Alternative 7 projects 7.5 miles. Alternative 5 would be the highest with an estimated 11 miles of road construction or reconstruction needs. For alternatives where new road construction is required, indirect effects would be access provided for other Forest activities such as recreational use and fire suppression if through site-specific analysis it is determined the road stays in place.

Effects on Roads/Access Management from Special Use Authorizations

Pipelines, overhead power lines, and communication developments can potentially require road construction or reconstruction for installation and maintenance. In some cases, helicopters can be used effectively reducing new road construction needs. Little or no road construction and reconstruction associated with these sites is anticipated for all alternatives. A site-specific analysis would be needed prior to final approval of any utility or telecommunications site.

Cumulative Effects

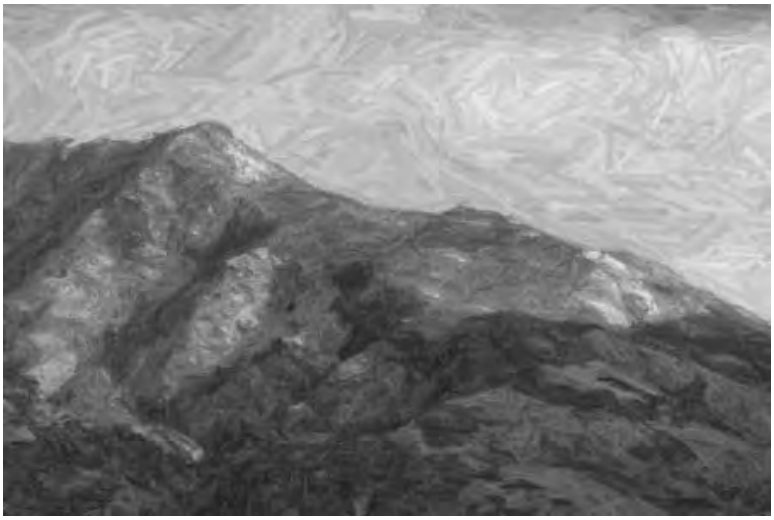
Analysis Area and Area of Influence

Reasonably Foreseeable Actions

The use of Forest roads will increase as populations grow and urban development expands near the WCNF. Primarily for recreational purposes, Forest arterials and major collectors that connect the WCNF to these areas are expected to experience the most increased day-use traffic, particularly on weekends. This traffic adds to the maintenance work necessary to keep roads in a safe and structurally sound condition. Road use for non-recreational purposes is not expected to increase and should not add substantially to road use surrounding the WCNF.

As travel to and through the WCNF increases, there will be an increase in congestion on surrounding public roads. Roads could see increases in use during the winter as decisions by other land management agencies such as in Yellowstone National Park restrict the use of snowmobiles within their areas. This could lead to more use locally as snowmobile use is displaced elsewhere.

The Forest Service is required by law to provide reasonable access to private inholdings. As ownership of these lands has changed in recent years, routes previously open to public access are frequently gated and locked. Current funding levels for activities to obtain right of ways are inadequate to keep up with these changes and public access to National Forest boundaries is decreasing.



Topic 4 – Recreation/Scenery Management

Recreation

Introduction

The following discussion provides information regarding recreation in the WCNF. The initial discussion concerns the currently existing condition (or affected environment) of the WCNF as it relates to recreation management. It provides descriptions of management concerns regarding recreation; factors considered to predict how recreation may be affected by the various alternatives; and existing laws, regulations, and policies by which recreation is managed. Following these discussions is a section describing how the various alternatives could affect recreation management. It describes general effects regarding each alternative, then more specific effects from potential management actions and the possible consequences of those actions.

Other resource areas and concerns also affect recreation management. Other topics closely related to Recreation Management include Topic 3-Roads and Access Management and Topic 5 Roadless Areas/Wilderness.

Recreation management for the USDA Forest Service involves a majority of natural and natural appearing settings that can assist in "quality recreation opportunities within the sustainable capabilities of National Forest ecosystems. We will emphasize natural settings and address the diverse interests of all Americans…" (USDA Forest Service. 2000a, pp.1). Managing recreation use within the sustainable capabilities of the land will be no easy task as "recreation is the fastest growing use on the national forests and grasslands" (USDA Forest Service 2000a, pp.2). This is true on the Wasatch-Cache National Forest (WCNF) where providing quality natural and natural appearing settings has long been a focus of management to promote a quality recreation experience.

The WCNF is a worldwide attraction for visitors seeking a variety of recreation settings. Recreation is currently the predominant use in the forest. Because of the forest's adjacent relationship to urban communities it is highly influenced by the rapid population increases occurring in the area. As recreation use has increased, so have conflicts between various user groups that are seeking the same areas for their recreation experience. This increased demand for specific recreation settings has created concerns for managers due to the deterioration of resources and facilities from overuse or conflicts among visitors with incompatible recreation activities or desired experiences such as motorized versus non-motorized.

In 1985 and 1995 the WCNF ranked first in total recreation visitor days (RVD's) in the National Forest system and consistently ranks in the top five forests for overall recreation use numbers. Factors affecting recreation management on the WCNF relevant to Forest Plan development include:

- rapidly growing and diversifying urban populations adjacent to the Forest and the competition with rural historic uses in the less urban parts of the forest resulting in conflicting desired uses and experiences

- education of the public to understand the effects of their activities on National Forest System lands and the need for them to actively participate in the management of these lands

- increasing undeveloped recreation demand, both summer and winter, where undeveloped sites may not provide adequate resource protection

- development of new technologies which change or increase visitors' ability to access and use various parts of the forest

- need for integrating recreation management with other resource values

- lack of awareness and understanding among recreationists of the potential for undesirable resource and social impacts from their behavior while using the Forest

- budget allocations which are flat or decreasing in spite of ageing facilities and increasing demands

Laws, Policy, and Direction

People have always enjoyed relatively free access and opportunities on federal public lands, although outdoor recreation as we now know it was not a priority consideration when the country began to set aside national forests. Laws from the late 1800's and early twentieth century focused on the establishment of national forests; on extractive uses including water, minerals, timber resources and livestock grazing; and on a variety of property and administrative management needs. Recreation use was present, but it was an unstated ancillary benefit.

Since World War II demand in America to use national parks, national forests, and other public lands has grown continuously, and legislation from the 1960's through the present day has more specific language on outdoor recreation on federal lands.

Multiple-Use Sustained-Yield Act (1960) – adds outdoor recreation as a use for which national forests were established.

Wilderness Act of 1964 and the Utah Wilderness Act of 1984 – provides for establishing Wilderness for environmental preservation as well as recreation.

Land and Water Conservation Act (1964) – provides continuing access to national forests and funding for recreation and defines admission and recreation fee collection guidelines.

Architectural Barriers Act (1968*)* – establishes that buildings, facilities, and vehicles meet standards suitable for persons with disabilities.

National Trails System Act (1968) – establishes that trails be provided to meet increasing recreation needs.

Wild and Scenic Rivers Act (1968) – establishes Wild and Scenic Rivers system, designates some rivers for the system, and defines appropriate levels of use and recreation within the system.

Executive Order 11644 (1972) and 11989 (1977) Off-Road Vehicles on Public Lands – provides for closing areas to off-road vehicles where resources would, or are, being negatively impacted. This is also covered under 36 CFR 295.

Forest and Rangeland Renewable Resources Planning Act (1974*)* – includes recreation among resources for which forest planning is required.

Americans with Disabilities Act (1990) - provides for standards so that disabled persons will not be discriminated against and have opportunities for access and use of facilities.

Over the past decade additional federal emphasis has been placed on outdoor recreation as a primary purpose for national forest use. Recently, the Forest Service has developed The Recreation Agenda, (USDA Forest Service. 2000a). This document clarifies agency policy and defines *national* principles, processes, and priorities in providing quality recreation opportunities. Recreation emphases from 100 years ago are being redefined.

Affected Environment

Forest-wide Recreation

"The Forest Service has a unique 'niche' of nature based recreation to offer, including undeveloped settings, built environments reinforcing the natural character, and wildland settings that complement enjoyment of these special places" (USDA Forest Service. 2000a, pp.2).

The WCNF is unique in several recreation aspects. Recognized as an urban forest, the WCNF is the backyard to nearly 1.7 million people living in close proximity to the forest. These people bring with them a wide range of recreational interests. People can drive from 15-30 minutes from their home and be at a ski area, developed recreation facility, trailhead, or Wilderness area. This part of the forest is most commonly visited for day use or short trips. Generally, these areas are more developed and have more recreation visitor days (RVD's) than other parts of the forest.

The backsides of the Wasatch Front, including areas around Kamas, Logan, the north slope of the Uintas, and the Stansbury Mountains are generally less developed and provide fewer RVD's. Visits are of longer duration and rural values influence the desired opportunities.

Finally, during winter, the WCNF is known for some of the best snow and skiing conditions available. Utah is nationally known for its quality snow and skiing terrain. Out of the 14 downhill ski resorts in the state, the WCNF administers five special use permits for operations based on WCNF lands.

The backsides of the WCNF offer less developed areas for winter snow-play, snowmobile touring and hi-marking, groomed ski trails, and backcountry winter yurts used by the more hardy winter visitors.

Recreation managers generally concern themselves with managing settings and with determining what types of activities may be appropriate within each setting. To match the diversity of recreation interests with appropriate opportunities, the WCNF offers a variety of recreation settings. These settings are differentiated by the amount of development and other attributes incorporated into a recreation-planning tool called the Recreation Opportunity Spectrum (ROS). The Forest Service uses this mapping and classification system to distinguish between different types of recreation settings in the Forest. The ROS system provides a way to help managers and recreation users understand what recreation experiences to expect and where these are available across the Forest. ROS can help people visualize the variety of natural outdoor settings, the types of activities that can be pursued, and how many other people might be found in an area of the Forest.

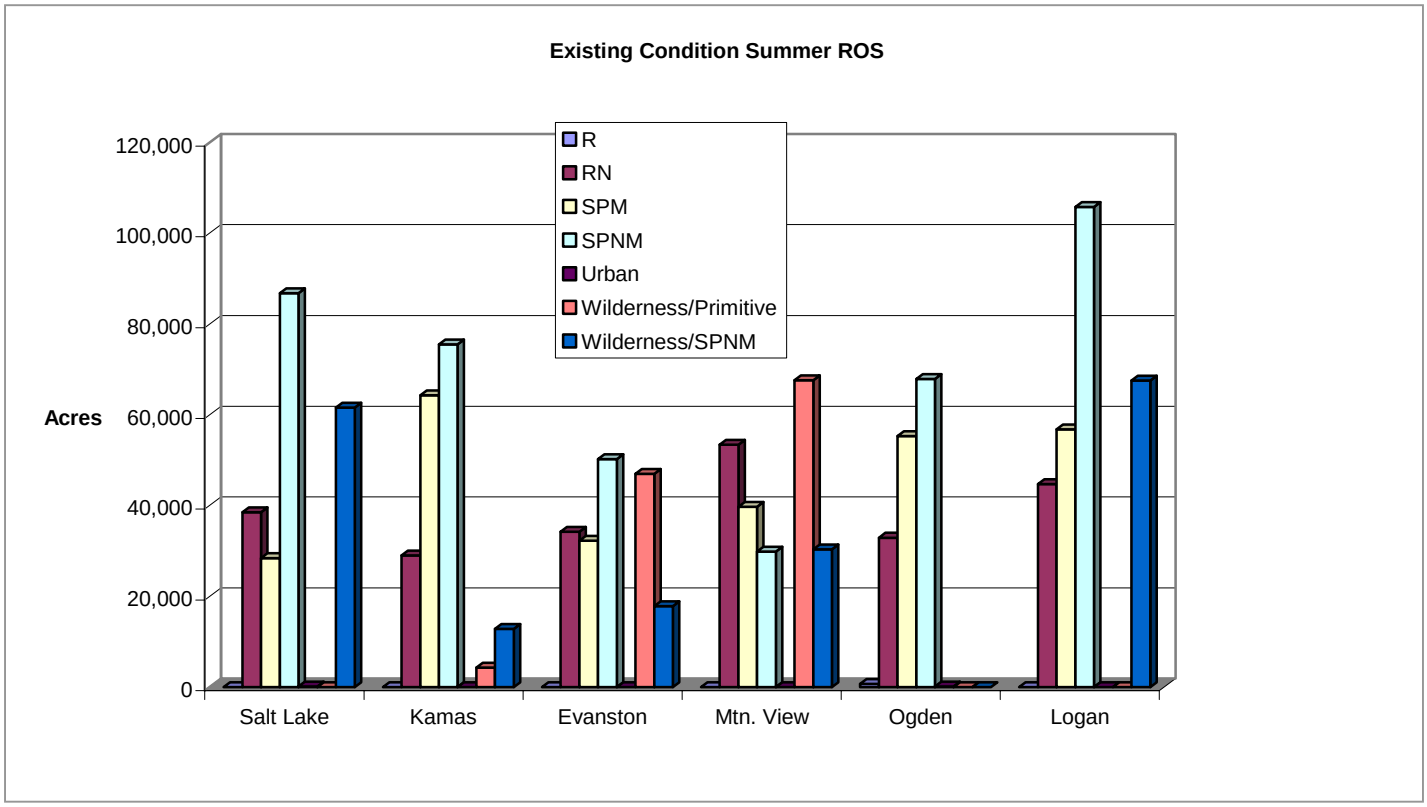
For WCNF planning, the Forest was divided into six recreation opportunity categories and one sub-category that are differentiated by the physical setting (remoteness and human modification), social setting (the amount of social interaction between users) and managerial setting (the amount of managerial presence and information). See FEIS Appendix D-2 for complete descriptions of settings for the ROS classes. The ROS classes were conceptualized to range from a primitive setting with little development or site modification, low visitor interaction and minimum management presence (such as the interior of the High Uintas Wilderness), to an urban setting where visitors may see an unlimited number of people in a highly developed landscape with the highest level of management presence (e.g. Pineview Reservoir area). Table REC-1A and Figure REC-1 display the existing condition (as inventoried) Recreation Opportunity Spectrum acres, by Ranger District, for summer recreation opportunities in the WCNF.

Table REC-1a. Existing Condition Summer ROS Acres by District

ROS Category	Summer ROS Existing Condition Acres by Ranger District						
	Salt Lake	Kamas	Evanston	Mtn. View	Ogden	Logan	W-C Total
Rural	0	0	0	0	700	0	700
Roaded Natural	38,500	29,000	34,200	53,400	32,900	44,700	232,700
SPM	28,400	64,300	32,200	39,700	55,300	56,800	276,700
SPNM	86,800	75,500	50,200	29,800	67,900	105,800	416,000
Urban	100	0	0	0	100	0	200
Wilderness/Primitive	0	4,300	47,000	67,600	0	0	118,900
Wilderness/SPNM	61,600	12,800	17,800	30,300	0	67,500	190,000

SPM: Semi-Primitive Motorized
SPNM: Semi-Primitive Non-Motorized

Figure REC-1. Relative Acres Inventoried Existing Condition ROS by District



ROS summer existing condition was mapped separately from winter recreation existing condition. Both ROS summer and winter recreation existing condition is derived from current District Travel Management Maps. A comparison of Tables REC-1A Existing Condition and REC-1B 1985 Forest Plan shows that since 1985, the Forest Plan ROS map for both summer and winter has not been updated to show changes in management resulting from Travel Planning. The inventoried existing condition is used as a base line for comparing Alternatives other than Alternative 4 which represents direction of the 1985 Plan. For comparison of Alternatives and how they might affect today's recreation opportunities, the existing condition is more meaningful than Alternative 4. The Alternative 4 (1985 Plan) ROS summer classes reflect higher levels of maintenance on roads than what is currently being managed for. However, available budgets have not matched 1985 projections and subsequent maintenance and development was less than anticipated creating the current existing condition. Alternative 4 represents the 1985 plan ROS map for desired future condition showing a possible increase in budgets and an increased level of maintenance for roads neither of which have happened to the degree anticipated.

Table REC-1b. Relative Acres in 1985 Forest Plan ROS by District

ROS Category	Summer ROS 1985 Plan Acres by Ranger District						
	Salt Lake	Kamas	Evanston	Mtn. View	Ogden	Logan	W-C Total
R	6,400	500	0	0	5,300	1,500	13,700
RN	25,400	109,600	93,300	122,700	59,100	135,300	545,400
SPM	34,100	2,400	0	0	24,300	24,700	85,500
SPNM	83,200	56,400	23,100	200	59,600	19,300	241,800
Urban	0	0	0	0	0	0	0
Wilderness/Primitive	61,500	17,100	64,800	98,000	0	66,100	307,500
Wilderness/SPNM	0	0	0	0	0	0	0

For winter recreation, budget had little to do with changes in management. For actual motorized winter access in 1985, technology was the limiting factor. There are numerous areas on the Forest that are shown as open to winter motorized recreation on 1985 maps but that were not accessed by motorized users due to the steepness of slope, snow conditions, and vegetation densities. Since 1985, winter motorized access has changed significantly because of technological enhancements. Today few areas on the Forest are not accessible by winter-motorized users. Again, the 1985 Maps were not kept up-to-date as changes were made to winter motorized recreation through Travel Planning. Tables REC-2a and REC-2b show the comparison of Existing Condition Winter Recreation (REC-2a) and 1985 Winter Recreation (REC-2b). Note that we have included an inventory of areas both in and outside of designated Wilderness where motorized use is occurring even though the areas are closed to motorized use. These are labeled “w/Trespass” in Table REC-2a.

Table REC-2a. Existing Condition Acres of Winter Recreation by District

Winter Recreation Opportunities	Existing Condition Acres of Winter Recreation by Ranger District						
	Salt Lake	Kamas	Evanston	Mtn. View	Ogden	Logan	W-C Total
Heli-skiing	17,300	0	0	0	0	0	17,300
Motorized	8,500	154,100	94,800	93,500	108,400	175,400	644,500
Non-Motorized	144,800	14,700	20,100	27,700	49,400	27,600	274,400
Non-Motorized w/Trespass	100	0	1,600	1,600	0	4,100	7,300
Wilderness	61,300	17,100	64,800	97,900	0	51,300	292,400
Wilderness w/Trespass	400	0	0	0	0	16,300	16,700

Figure REC-2a. Relative Acres of Existing Condition Winter Recreation Opportunities by District

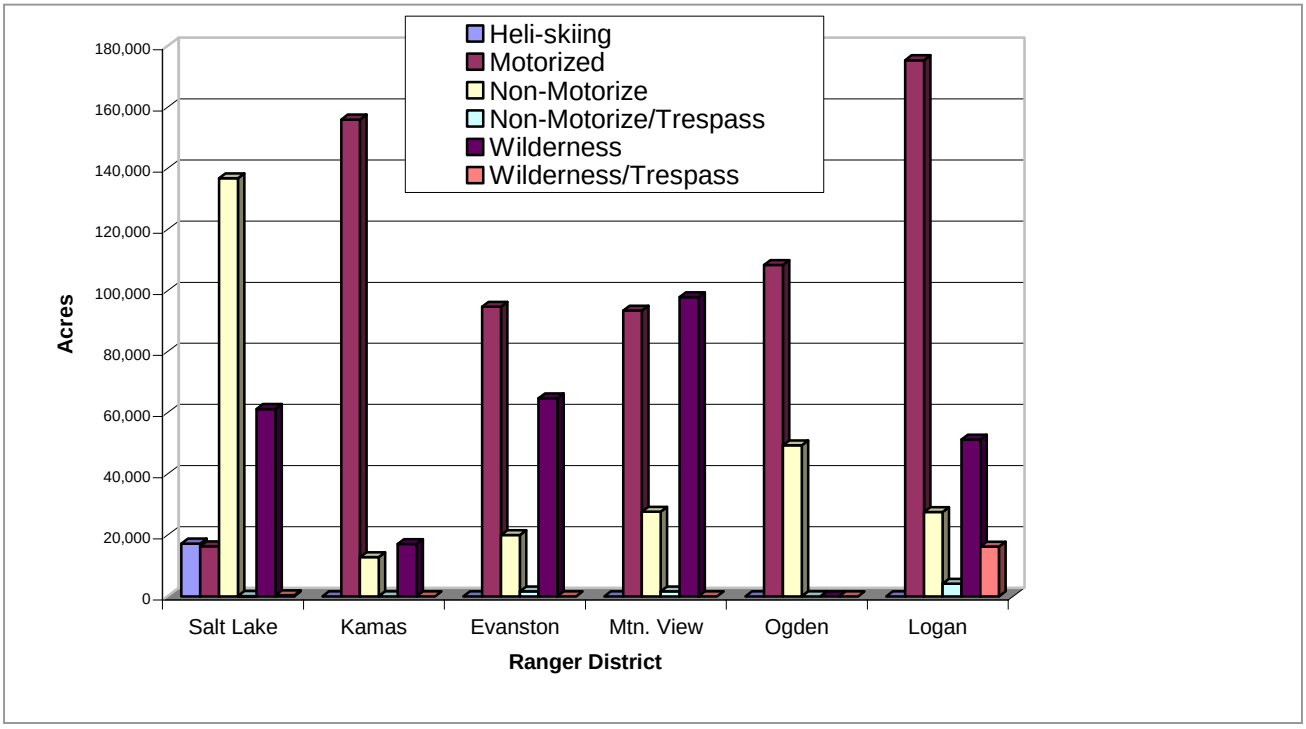


Table REC-2b. Acres from 1985 Forest Plan of Winter Recreation by District

Winter Recreation Opportunities	1985 Forest Plan Acres of Winter Recreation by Ranger District						
	Salt Lake	Kamas	Evanston	Mtn. View	Ogden	Logan	W-C Total
Heli-skiing	17,300	0	0	0	0	0	17,300
Motorized	65,900	168,600	95,100	122,700	103,800	167,000	723,100
Non-Motorized	83,200	200	21,400	200	49,300	13,900	168,200
Wilderness	61,500	17,100	64,800	98,000	0	66,100	307,500

Types and Levels of Recreation Use

While the different settings classified above provide the basic opportunities for recreation experiences, it is important for recreation managers to recognize what activities visitors are coming to the Forest to enjoy and to understand any trends in user demand. The Forest Service Recreation Information Management (RIM) reports display information on the types and amount of recreation activity that takes place on the Forest. These reports contain estimates of the number of Recreation Visitor Days (RVD = number of people on WCNF for a 12 hour period of time) for selected activities. These reports were updated yearly, until 1997, by looking at the percent of change based on fee payments, highway traffic counts, and field manager estimates of the changes in use.

Between 1984 and 1997, WCNF RIM reports indicate that use on the forest increased by nearly 1 million visitor days. Although RIM reports do not display exact numbers of visitors, they are

useful to show trends in use patterns over time. Table REC-3 ranks the top ten selected activity categories for the WCNF based on 1996 RIM numbers and shows how these activities ranked within the Intermountain Region (R4).

While not in the top ten use categories some activities and trends are of additional management concern. Mountain biking showed no RVD's in 1984 and over 95,000 in 1997. Off highway vehicles showed 100 RVD's in 1984 and 10,973 RVD's in 1997. There is a dramatic trend toward increased use of ATV's and snowmobiles. The number of snowmobiles and ATV's registered in Utah has climbed from about 26,000 in 1980 to about 111,000 in 2000 (Thompson, H. 2001 2001). There is a trend toward increasing numbers of ATV user created trails and ATV operation on roads with mixed traffic. Growth in these activities is an important consideration for managers as well as visitors.

Forests nationwide are developing new databases to help recreation managers provide consistent information to users, Congress, and agency decision makers. The National Recreation Business Management System (Meaningful Measures) is being developed to help improve management effectiveness by establishing quality standards, estimating costs, and prioritizing workloads. Information for this database is still being input and analyzed. Eventually this system will provide the most consistent data available.

Table REC-3. Ranking of the Top Ten Forest Activities by 1996 Reported RVD's and How That Activity Ranks in the Intermountain Region (R4)

Activity^	Regional Ranking
1. Auto Travel	2
2. Camping*	1
3. Downhill Skiing	8
4. Hiking/Walking*	5
5. Viewing Scenery*	4
6. Picnicking	9
7. Hunting*	7
8. Fishing*	6
9. Recreation Cabin Use	14
10. SnowPlay*	3

*Similar categories were combined to create these categories.
^These uses account for 84 percent of total reported 1996 RVD's.

Demand

As a primary provider of outdoor recreation settings for Northern Utah, the WCNF is feeling a tug-of-war between various recreation user groups and their desires and demands of the forest. In general, there is a continuing and growing demand for a diversity of recreation opportunities on public lands. As the population continues to grow (predicted to be an increase of 1,000,000 by 2020, (EU, 2002), it is expected that the demand for outdoor recreation will increase at a similar or greater rate (USDA Forest Service, 1995).

Managers do know that undeveloped recreation use is increasing. According to Cole (1996) in an analysis of National Wilderness and Park Service use data, backcountry recreation use has increased with an average annual growth rate of 11.4 percent per year since 1990. This rate is

likely even higher since the analysis did not include day use, which is also thought to be increasing rapidly, or motorized undeveloped recreation. Many of these demands are not compatible with the desired experiences of other recreation user groups as well as the various other multiple use interests (e.g., grazing, oil and gas leasing, timber harvesting, etc.).

Conflicts between users are becoming more prevalent and according to one study (Muth and Fairey, 1995) social conflicts over recreation opportunities will increase in the future. This is largely due to an increase in conflicting individual and social values leading to a greater diversity of special interest groups, each advocating recreation activities that suit their own needs. Competition for allocations of recreation opportunities often results in conflicts when desired activities are not compatible (Blahna, Smith, and Anderson, 1995). This is resulting in an increasing need for conflict management. In light of population growth estimates, we also anticipate conflicts will increase. The day will come in the near future when the WCNF will not be able to meet the diversity of demands placed on it. This leaves forest management in the position of deciding which demands may or may not be met in the future.

Tourism, and marketing associated with it, also affects demand and availability of recreation opportunities. The State of Utah considers tourism an important source of current and future economic growth. According to information in the (Utah, State of. 2000e) tourist demand has shown only modest growth recently (1-2 percent), but is expected to grow at a greater rate over the next five years due to the publicity and recognition related to Salt Lake City hosting the 2002 Winter Olympics. For the WCNF much of the tourist industry is associated with driving for pleasure and downhill skiing. Additional services of value to visitors from outside of the area, and provided within WCNF lands, include outfitting and guiding for hunting, fishing, and winter sports activities.

The diversity of Utah landscapes provides spectacular scenic vistas for the traveling public. The WCNF is no exception as demonstrated by the one National Scenic Byway, four State Scenic Byways and nine State Scenic Backways (see Table RM-6 in Topic 3-Roads Access Management) providing opportunities for driving for pleasure and viewing scenery. Downhill skiing is a major attraction bringing visitors to Utah. Being within a one-hour drive from a major international airport and a large metropolitan area, the five ski resorts on the WCNF provide some of the easiest downhill ski access anywhere for out-of-area visitors. Nature-based activities such as hunting and fishing depend on large, open areas with intact habitats one could find on the WCNF. Winter sports are also dependent on open, high elevation settings found largely on the WCNF.

Current demand on the WCNF from the tourism industry is not known. Demand is affected by numerous factors such as weather, economic considerations, currency exchange rates, and marketing and promotion efforts. By providing a diversity of recreation opportunities within the natural setting, the WCNF partners with the tourism industry to provide for many of the opportunities they market.

Developed Recreation

Developed recreation sites are those areas containing a concentration of improvements, facilities and services which are built primarily to invite, encourage or enhance participation in a

recreation activity or visitor experience as opposed to providing facilities just for resource protection. Improvements considered developed sites could range from campgrounds with water systems, flush toilets and showers, to small trailheads with bulletin boards or barrier rocks, to delineated parking lots.

The WCNF manages a wide array of developed recreation sites. Concessionaires now operate approximately 98 percent of these sites under permit. Concessionaires are private businesses, which operate and maintain Forest Service recreation facilities under special-use-permits (SUP's). Five major ski areas are managed under SUP's on the WCNF. Private concessionaires operate about 70 campgrounds and assorted day-use, picnic areas, boat launches, interpretive sites, and some trailheads (Table REC-4). Many campgrounds are older facilities, which have trouble accommodating visitors driving larger vehicles, often with recreation vehicles in tow. Many of these older sites are also not designed to accommodate persons with disabilities.

Table REC-4. Number of Developed Recreation Sites by Ranger District on the WCNF and the Number of People at One Time (PAOTs) Sites are designed to Accommodate

SITE TYPE	SLRD (D1)	KRD (D3)	ERD (D4)/ MVR (D5)	ORD (D6)	LRD (D7)	FOREST TOTALS
	# Sites / PAOTs	# Sites / PAOTs	# Sites / PAOTs	# Sites/ PAOTs	# Sites / PAOTs	# Sites / PAOTs
Publicly Developed Facilities						
Campgrounds	13 / 3205	19 / 3572	15 / 1995	13 / 1935	16 / 2355	76 / 13062
Picnic Areas	19 / 2105	6 / 435	1 / 45	3 / 1190	10 / 605	39 / 4380
Interpretive/Obser.	2 / 410	7 / 326	5 / 125	2 / 70	15 / 325	31 / 1256
Boat Launch/Swim				3 / 758		3 / 758
Trailheads	10 / 904	16 / 1653	13 / 1322	10 / 640	18 / 1497	67 / 6016
Angler Parking		10 / 693		2 / 120		12 / 813
Winter Resorts	4 / na			1 / na		5 / na
Winter Play Area			1 / 420			1 / 420
Privately Developed Facilities (Under Special-Use Permit)						
Recreation Residences	142 / 710	41 / 205	40 / 200	45 / 225	83 / 415	351 / 1790
Organization Camps	1 / 50	2 / 100	1 / 50	2 /100	2 / 100	8 / 400
Clubs	2 / 100	1 / 50		1 / 50	2 / 100	6 / 300
Restaurants	1 / 100					1 / 100
Stores	1 / 25					1 / 25
Outfitter and Guides	6 / na	3 / na	1 / na	0 / na	5 /na	15/na

Data from Meaningful Measures Report # 34, developed on Jan. 5, 2001

Some of these developed facilities are constructed by the Forest Service on public land, but are managed and maintained by concessionaires. These publicly developed facilities often include campgrounds, picnic areas, and trailheads. The WCNF also has permitted uses where the facilities are constructed and maintained by the businesses or private individuals, but are located on public lands. These privately developed facilities can include Winter Resorts (generally ski areas), recreation residences, and organization camps. Whether these developed facilities are

public or private, they all operate under Forest Service regulations specified in their individual permit.

Currently most districts on the Forest report that campgrounds and many other developed sites are full on weekends from July through September. In the more popular sites, use exceeds capacity. There are two types of capacity considered for management of developed sites, design capacity and operational capacity. Design capacity is based on the number of people at one time (PAOT) a site is designed to accommodate. The operational capacity of a site is calculated as 40 percent of the design capacity and is the level beyond which long-term resource damage is likely to occur. Information extracted from the Meaningful Measures database (Table REC-5) suggests that developed recreation sites are nearing design capacity, or meeting it at the most popular individual sites, during holidays and week ends in the summer season. Table REC-5 also shows that developed sites are exceeding operational capacity during the high use and holiday seasons.

Table REC-5. The Weighted Average Occupancy, by Percent and Season of Use, of Developed Recreation Sites on the WCNF

	Season of Use and Percent Occupancy			
Ranger District	**High**	**Shoulder**	**Low/Closed**	**Holiday**
Salt Lake RD	48%	15%	1%	99%
Kamas RD	78%	31%	5%	92%
ERD/MVRD	35%	7%	0%	75%
Ogden	51%	30%	8%	85%
Logan	33%	15%	3%	69%
WCNF	49%	21%	4%	84%

Data from Meaningful Measures Report 34, developed on Jan. 5, 2001

In light of the population growth projections for the state, visitation is expected to continue to increase, causing some weekend visitors to be displaced or unable to find their desired recreation setting or experience. Some of these visitors will be displaced to less developed or undeveloped areas where increasing concentrations of human use are more likely to cause unacceptable resource impacts.

Undeveloped Recreation

Concentrated Use Areas (CUAs) are areas where undeveloped site(s) are located where amenities management focuses on resource protection rather than user convenience. They may contain some level of development, but improvements are made with the primary purpose of protecting the biophysical resource.

As developed campgrounds fill–up on weekends during the summer, visitors are displaced, often to undeveloped camping areas where no mitigation measures have been taken to protect the resource. Many other visitors choose an undeveloped setting for their desired activities or experiences. Some visitors, such as horseback and OHV groups, are often restricted from developed sites and must choose undeveloped recreation sites. These groups often select trailheads for their camp, increasing impacts there and affecting availability for other user groups and day use activities.

Recognizing their uses have impacts some organized groups, such as Backcountry Horsemen of America, work with the Forest Service to educate the public concerning equestrian impacts and assist the Forest Service in maintenance and rehabilitation projects.

Recreation managers do not know exactly how many people use the forest daily, what they come for, or how they perceive their visit. We do know that there are unacceptable levels of resource impacts in some areas. Heavily used undeveloped campsites in riparian areas; evidence of litter and human waste; and campsite impacts relating to soil, vegetation, aquatic resources, and water quality are all concerns.

While the aerial extent of these factors in relation to the total size of the WCNF is small, these localized concerns can cause unacceptable impacts to valued biophysical or social resources. These impacts may be the result of desired activities, but may also affect the desired experiences of other visitors or the desired condition of associated resources.

Hunting is one activity that places a high demand on undeveloped recreation settings. This use is seasonal and intense. Visitors tend to camp in large groups extending resource impacts beyond other typical uses. The major hunts for deer and elk occur in the late fall when roads and trails are often wet, causing impacts to these systems as well as soil, water, and vegetation resources. Fishing use occurs over a longer period with peak use on weekends. Impacts are localized to lake and stream shores with some additional impacts at highway pullouts and associated access trails.

Trails Management

Another important component of undeveloped recreation is the trail system. Trails provide visitors access away from developed recreation sites and support many recreation activities such as backcountry camping, hiking, hunting, horseback riding, OHV riding, and mountain biking. The Forest trail system is managed for multiple-use. However, not all uses are accommodated on all trails. Trails are managed to facilitate public travel and access in the backcountry. Continued access to well-maintained and signed trails is of great importance to our public users. An increased demand for trail activities has placed a greater emphasis on trail system planning, construction, and reconstruction.

In general, many trail users expect a primitive experience with physical challenges. However, there are exceptions, such as urban trails with limited grades and easy walking surfaces, nature trails, and short popular destination trails. Access for range, fire control and other administrative uses are other purposes for trails.

The need for trails and their management is a priority by both the public and the Forest Service. In January of 2001, President Clinton signed an executive order called “Trails for America in the 21st Century” which emphasized providing trail opportunities of all types with minimum adverse impacts and maximum benefits for natural, cultural and community resources.
Most of the trails on the WCNF receive very high use, except for a few more remote, low maintenance trails. Many trails now receive year-round use. Hiking, horseback riding, biking and motorized use of trails are popular in the summer. Winter use on trails for cross-country

skiing, snowshoeing and snowmobiling has greatly increased. Trails are often crowded at popular trailheads on weekends and holidays, particularly near the Wasatch Front.

One of the most challenging issues for trail managers is where to provide opportunities for motorized and mechanized travel on trails, as well as to minimize user conflicts and resource impacts. All trails are open for hiking and most are open to horseback riding and biking. There are a few closures for horses such as in the Salt Lake City watershed (which is also mostly closed to motorized uses), on interpretive-nature trails, boardwalk trails, during some recommended seasonal closures such as during wet conditions, and winter cross-country ski or snowmobile trails. A few trails in the Forest, primarily interpretive nature trails, are barrier free and facilitate access for the physically challenged.

Specific routes and their appropriate uses are displayed in Travel Maps created at the Ranger District level. These maps indicate which routes are motorized or non-motorized in the summer and winter, as well as showing which areas are open and closed to oversnow motorized uses. On the WCNF summer overland travel is on designated-open routes only. Oversnow travel is less restricted with open areas and a few designated routes. Motorized use is especially popular during the fall hunting season.

There are 1679 miles of system trails on the Forest of which 1381 miles (82 percent) are non-motorized and 306 miles (18 percent) are motorized. Motorized uses are also allowed on most of the approximately 1600 miles of road within the Forest many of which are relatively primitive providing a rugged motorized experience. Of the non-motorized trails *358* miles (26 percent) are in Wilderness (Table REC-7). In addition to these total miles, there are approximately 162 miles of state groomed snowmobile trails on all but the Salt Lake Ranger District that have not been added to the system trails inventory. There are approximately 427 different trails on the forest. In addition, there are many user-created non-system trails. The 1985 Forest Plan listed approximately 1,041 miles of trails. This shows a 38 percent increase in mileage since 1985; however, much of this difference may be due to changes in inventory accuracy and types of trails counted.

The Cache-Box Elder Management Area has the highest percentage of total miles of trails and non-motorized trails (25 percent) of the seven management areas, while the Western Unitas Management Area has the highest percentage of motorized trails (29 percent) (Table REC-6). Table REC-6 includes only trails and portions of trails that are on WCNF lands. The table does not include portions of trails that are on private or state lands.

Table REC- 6. Trail Miles by Management Area

Management Area	*% of* Total Miles *on the Forest*	*% of* Non-Motorized *Total Miles on the Forest*	*% of* Motorized *Total Miles on the Forest*
Bear	*3*	*3*	*2*
Cache – Box Elder	*25*	*25*	*23*
Central Wasatch	*14*	*16*	*4*
Eastern Uintas	*20*	*23*	*9*
North Wasatch-Ogden Valley	*13*	*12*	*20*
Stansbury	*5*	*3*	*13*
Western Uintas	*21*	*19*	*29*

Appropriate trail uses are typically managed at the Ranger District level. The Salt Lake Ranger District has the most miles of trails (total miles and non-motorized miles) of all the Ranger Districts, while the Kamas Ranger District has the highest amount of motorized miles (Table REC-7). There are several designated, motorized trail networks. Approximately 57 trails are open to ATV use and 74 trails are open to motorcycle use on the Forest.

Table REC-7. Non-Motorized, Motorized, and Wilderness System Trail Miles by Ranger District

Summer Trail Use Categories	miles	% Dist	% WC	miles	% Dist	% WC	miles	% Dist	% WC	miles	% Dist	% WC	miles	% Dist	% WC	miles	% Dist	% WC	miles	% WC
1 Hiking	36.1	10	14	76.3	28	30	77.2	33	31	20.0	7	8	34.6	15	14	6.9	2	3	251.1	15
2 Hiking, Biking	96.8	27	79		0	0	1.0	0	1	23.0	8	19		0	0	2.0	1	2	122.8	7
3 Hiking, Biking, Horse	116.0	32	21	77.4	28	14	39.3	17	7	19.2	6	4	158.7	68	29	137.5	49	25	548.1	32
4 Hiking, Horse	35.0	10	8	70.0	25	15	93.2	40	20	171.8	56	37		0	0	88.8	32	19	458.8	27
5 Hiking, Biking, Horse, Motorcycle	42.3	12	48		0	0		0	0		0	0	27.0	12	30	19.6	7	22	88.9	5
6 Hiking, Biking, Horse, ATV		0	0		0	0		0	0		0	0		0	0	3.0	1	100	3.0	0
7 Hiking, Biking, Horse, ATV, Motorcycle	25.6	7	12	52.8	19	26	22.2	10	11	71.5	23	35	12.7	5	6	21.6	8	10	206.4	12
8 Hiking, Biking, ATV, Motorcycle	7.7	2	100		0	0		0	0		0	0		0	0		0	0	7.7	0
Total	359.5	100	21	276.5	100	16	232.9	100	14	305.5	100	18	233.0	100	14	279.4	100	17	1,686.8	

Winter Trail Use Categories	Salt Lake miles	% Dist	% WC	Kamas miles	% Dist	% WC	Evanston miles	% Dist	% WC	Mountain View miles	% Dist	% WC	Ogden miles	% Dist	% WC	Logan miles	% Dist	% WC	Total WCNF miles	% WC
1 None*	313.9	87	30	45.0	16	4	123.6	53	12	172.7	57	17	150.5	65	14	237.3	85	23	1,043.0	62
2 XC Ski	4.0	1	6	9.0	3	14	10.2	4	16	20.0	7	31	21.2	9	33		0	0	64.4	4
3 Snowmobile	41.3	11	11	200.5	73	52	32.1	14	8	89.8	29	23	19.6	8	5	3.9	1	1	387.2	23
4 Snowmobile, Groomed Snowmobile		0	0	21.9	8	14	67.0	29	41	23.0	8	14	41.7	18	26	8.3	3	5	161.9	10
5 Groomed Snowmobile		0	0		0	0		0	0		0	0		0	0	30.3	11	100	30.3	2
Total	359.2	100	21	276.4	100	16	232.9	100	14	305.5	100	18	233.0	100	14	279.8	100	17	1,686.8	

In the winter, snowmobile use is very popular. There are groomed snowmobile trails on all Districts except for Salt Lake. Most of these routes are on roads closed for the winter and are groomed in partnership with the State of Utah, Division of Parks and Recreation. Snowmobiling is not allowed in Wilderness, research natural areas, groomed cross-country ski areas, or critical big game winter range. Trails open to snowmobiles vary, depending on District travel plans and snow conditions.

The types of trail uses, the volume of trail users, trail conditions, maintenance, available information, signing, and parking affect trail user experience. Many trails are open for more than one type of user. There are conflicts between user groups on trails. Many trails have evolved without considering trail location suitability or priority of uses. Problems with travel management direction include unclear management direction and the lack of loop facilities. Some trails that access National Forest land actually begin on private land, have been historically used for access and need right-of-ways for access because of developments and private landowners closing them off. Trailheads on the Forest vary from those with large parking lots, kiosks, and facilities to those that are just a small pull-off by the road.

Some trails are groomed for cross-country ski opportunities and closed to motorized use. These areas on the Forest are quite popular. The main areas that are groomed for cross-country skiing are Mill Creek (Salt Lake District), Beaver Creek (Kamas District), Lily Lake (Evanston District), Henrys Fork and Dead Horse (Mountain View District) and about 10 trails on the Ogden Ranger District.

In the 1985 Plan the goal was to construct and reconstruct 20 miles of trail annually. Only about 25 percent of that objective was met, due to experienced funding. The 1992 Plan Monitoring Report identified an average of 4.7 miles of trail construction and reconstruction from 1986 to 1991. From 1992 to 2000, approximately 46 miles of new trail have been constructed and 102 miles of trail reconstructed on the Forest. Most new trails were constructed on the Salt Lake and Ogden Districts (Central and North Wasatch – Ogden Valley geographic areas), while the Kamas, Evanston/Mountain View (Western and Eastern Uintas geographic areas) and Logan Districts (Cache – Box Elder geographic area) have higher mileages of reconstructed trails.

A large backlog of trail maintenance exists and many of the older trails in the system are in poor condition and continue to deteriorate because of lack of budget for maintenance and improper location. Only a small percentage of trails receive adequate maintenance due to limited trails management budgets. Some maintenance of trails is done by volunteer labor. The Forest Service is currently doing inventories of existing trails (INFRA) and determining costs to maintain and bring trails up to standards (Meaningful Measures).

Special Designation Trails

The Forest has two designated National Recreation Trails – Bald Mountain Trail on the Kamas Ranger District and the Naomi Peak on the Logan District, more than half of which is in the Mount Naomi Wilderness.

There are also small National Historic Trail segments of the Mormon Pioneer, Pony Express, and the historic Donner-Reed route. These three trails use the same route, cross small portions of the Forest just north of Mountain Dell Reservoir and south of Big Mountain Pass on the Salt Lake Ranger District. In addition, the Weber Canyon route of the Hastings Cutoff National Historic Trail passes through about two miles of National Forest lands on the Ogden Ranger District. It is believed there is no intact portion of this route remaining. There are two very important regional trails on the Forest, the Great Western Trail and the Bonneville Shoreline Trail.

The Great Western Trail (GWT) is a trail of National, Regional and Statewide importance. The plan for it is to include over 4,455 miles of roads and trails crossing five states including Utah from Canada to Mexico. Approximately 1,600 miles of the trail is in Utah, including those segments on the WCNF. The trail has been proposed as a national trail in a new designation called "National Discovery Trails". These National Discovery Trails will be continuous interstate trails and their purpose is to help users experience and learn about aspects of American life and history and aid in connecting urban areas with rural and backcountry areas.

In most cases, the trail corridor is a combination of existing roads and trails and has both motorized and non-motorized segments. Trail segments facilitate both winter and summer use. Often the trail has parallel routes to separate motorized and non-motorized users. Local communities view the GWT as providing both recreational and economic benefits. Most of the route exists on the Wasatch – Cache and segments cross all Districts on the Forest except for Mountain View. The segment on Kamas and Evanston Ranger Districts is winter only and follows the Mirror Lake Highway 150 and Soapstone Basin Road 80037.

The Bonneville Shoreline Trail (BST) is a trail proposed by the State of Utah with regional and local importance. The trail was designated as one of sixteen national Millennium Legacy Trails in October 1999. It will stretch more than 100 miles north to south along the Wasatch Front, tracing the ancient eastern shoreline of Lake Bonneville as much as possible. The proposed route is from Santaquin in the south to Brigham City in the north. Additional proposals extend the BST north from Brigham City along the Wellsville Mountains to Tremonton, and then the trail would enter Cache Valley and follow the shoreline there. This trail affects the Salt Lake, Ogden and Logan Ranger Districts of the Wasatch – Cache, as well as the Uinta National Forest. Local communities look for the BST to provide both recreational and economic benefits. Parts of the trail have been constructed, other segments are in various planning stages and much of the preferred trail route is off the Forest, but it could provide essential ties between the communities and the WCNF. The route is proposed for non-motorized use. Uses such as horse back riding, biking and hiking may vary by the segment and location of the trail.
The objectives of the trail are:

- Provide ready access to the Wasatch foothills public lands.
- Provide a place for people to pursue their recreational pursuits that is safe and aesthetically pleasing, trying where possible to accommodate a broad range of non-motorized uses.
- Provide a place for people to have an opportunity for quiet and scenic recreational use nearby, yet apart from the urban Wasatch front.
- Provide for rapid deployment of fire fighting resources to the urban/foothills interface, opportunities for backfiring operations, cleared trails for firefighter escape routes, and to serve as a buffer between the urban and natural environments.
- Contribute to the preservation of aesthetic, wildlife, historic and educational values of the foothills.

Recreation Special Uses

Many uses on the WCNF require formal management authorization. All commercial uses on the WCNF are regulated. These uses are generally authorized by Special Use Permits (SUPs). Recreation special uses range from agreements with private entities to manage publicly

developed facilities such as campgrounds and picnic areas to agreements regarding private facilities or activities such as ski areas, recreation residences or outfitter and guides (refer to Table REC-4 for uses under permit).

Ski Area Management

Five ski areas operate on National Forest System Lands administered by the WCNF. Existing resorts include Alta, Snowbird, Solitude and Brighton located in Salt Lake County and Snowbasin located in Weber County. Since the 1985 Plan was written, Beaver Mountain ski area in upper Logan Canyon is no longer on National Forest System lands as the result of a land exchange completed in 1999.

A number of ski areas lie outside, but near the Wasatch-Cache and influence development at National Forest-based areas. The Canyons Ski Resort, Park City Mountain Resort, and Deer Valley resort are located in Summit County and play a significant role in the ski industry of Utah.

Nordic Valley, Beaver Mountain and Powder Mountain are smaller ski areas that serve local clientele. New development is also being planned on Bonanza Flat in Wasatch County with ski lifts and ski terrain connecting to Park City and Deer Valley and adjacent to Brighton's development area boundary.

Annual Skier Visits

The number of skier visits to the resorts on the WCNF is shown in Table REC-8. It shows the average annual growth rate since the 1985-86 skiing season. The 1985 Wasatch-Cache Forest Plan predicted a compound growth rate of 3.02 to be most likely during the time period 1985 through 2000 (USDA Forest Service. 1985). Forest plan projections were much higher than what has been experienced since 1985, which is essentially no growth. While these projections were oriented towards a different measure of skier activity, they provide a context for evaluating the accuracy of projections. The 1985 Forest Plan's projections were too high every year, especially during years with poor snow conditions. (Utah, State of. 1998)

Master Development Planning

Of the five major ski resorts under special use permit from the Forest, four have recently completed updates to their Master Development Plans (MDP). These updates outline ski trail terrain modifications and new or replacement facilities to be built within the next five years. All approved MDPs are in various stages of implementation.

Alta Ski Area MDP update was approved in November of 1997. Projects include trail modifications; lift replacements, building replacements, a remodeled day lodge, an access road and snowmaking facilities. All projects were approved to take place within current ski permit boundaries.

Brighton Resort MDP update was approved in October of 1999. Projects include trail modifications, lift replacements, replacement of buildings, a new day lodge, and additional snowmaking and further lighting for night skiing. Summer activities were expanded to provide more mountain biking opportunities. All projects were approved to take place within current ski permit boundaries.\

Table REC-8. Estimates of Utah Skier Visits by WCNF Ski Areas (in thousands)

Ski Areas On Wasatch Cache NF	Skier Visits 1985/1986	Percent of total Utah skier visits – 1985/1986	Skier Visits - 1999/2000	Percent of Total Utah skier visits – 1999/2000	Average annual growth rate - 1986-2000
Alta	439.7	17.7%	382.1	13%	-1.0%
Brighton	236.8	9.5%	337.1	11%	2.6%
Snowbasin	77.6	3.1%	79.6	3%	0.2%
Snowbird	343.2	13.8%	393.1	13%	1.0%
Solitude	230.9	9.3%	175.3	6%	-1.9%
UTAH	2,491.0	100%	2,977.0	100%	0.2%

Governors Office of Planning and Budget – Utah Ski Database – available at www.governor.state.ut.us/dea/publications; and for more recent years (98,99,00)USDA-FS, Intermountain Region Annual Skier Totals (2000)

Snowbird Ski and Summer Resort MDP update was approved in December of 1999. Projects include: trail modifications lift replacements, a new day lodge, a new mountaintop building, parking lot and road improvements and snowmaking facilities. Summer activities were expanded to provide more hiking opportunities. All projects were approved to take place within current ski permit boundaries. As part of the MDP, 500 acres of additional skiing terrain was opened on private land in Mineral Basin.

Solitude Ski Resort MPD update was approved in January 2002. Projects include trail modifications, lift replacements and upgrades, remodeling of buildings, a new mountain operations center, new day lodge, new fire station, new mass transit center and entrance modifications and additional snowmaking. Summer activities were expanded to provide more mountain biking opportunities. All projects were approved to take place within current ski permit boundaries. Extensive development on private land at the base is mostly complete.

Snowbasin MDP was approved in 1997. A land exchange authorized by Congress, was finalized in the summer of 2000. About 1200 acres of National Forest System lands at the base of the resort are now private lands where future development is planned or ongoing. Mountain facilities continue to be operated under permit. Facilities, lifts, ski trails and connector highway were constructed for use in the 2002 Olympic Winter Games.

Table REC-9 displays the number of Skiers At One Time for each of the ski resorts on the Forest.

Table REC-9. Skiers At One Time (SAOTs) Capacity by Ski Area

SKI AREAS	1985		1999	
	Lift Capacity (SAOTS)[1]	Number of Lifts[2]	Lift Capacity (SAOTS)	Number of Lifts
ALTA	4,525	8	5,202[3]	8
BRIGHTON	3,000	4	5,100[4]	7
SNOWBASIN	2,650	6	6,775	9
SNOWBIRD	4,400	8	5,950[5]	10
SOLITUDE	3,400	5	5,600	7

[1]WCNF Forest Plan, pg II-7
[2]WCNF 1982 Analysis of the Management Situation
[3]Approved capacity from 1997 MDP FEIS
[4]Approved capacity from 1999 MDP FEIS
[5]Approved capacity from 1999 MDP FEIS

Permitted Acres

The five ski areas on the WCNF have been under permit for many decades. Since the Forest Plan was approved, the National Forest Ski Area Permit Act was enacted. It allows the private sector to be permitted to operate ski areas on National Forest System lands for a period of up to 40 years. All resorts now operate under the newly issued 40-year permits. Table REC-10 shows that acres under permit have not changed significantly since 1985. Permitted acreages are often slightly different than acres that have been accurately measured during MDP planning with computer digitized mapping of permit boundaries.

Table REC-10. Permitted Acres, 1984 and 1999, by Ski Area

SKI AREAS	Acres Permitted – 1985		Acres Permitted- 1999	
	Private	WCNF	Private	WCNF
ALTA	321	1768	327	1803
BRIGHTON	158	845	164*	851*
SNOWBASIN	40	1801	40	1618
SNOWBIRD	-	881**	1629	1633**
SOLITUDE	164***	362	164***	363

Acreage taken from permits and applicable amendments except:
- data not available at time of publication.
*873 acres reported in MDP EIS. Difference in acreages is due to mapping. Brighton may have added 3 acres within Brighton Circle as part of 1991 MDP decision.
**from SL Ranger District FEIS, MDP and decision. 75 acres added in Mineral Basin, also private land in SL and Utah Counties.
***from SL Ranger District – no change in permit boundaries since 1985. More recent mapping of boundaries shows about 527 acres NF lands. Any differences due to more accurate mapping.

Future Expansion

In 1991, Brighton proposed expansion onto private land in the Snake Creek drainage in Wasatch County and into Hidden Canyon in Salt Lake County. A land trust eventually was able to purchase the lands in Wasatch County. Salt Lake County never approved expansion into Hidden Canyon. In Brighton's most recent Master Development Plan (MDP), no expansion outside the permitted boundary was proposed.

In the recent 1999 MDP decision for Snowbird, a proposal to include Scotty's Bowl in the permit area was denied. Snowbird has also expressed interest for expansion into White Pine.

Private Land

Private land expansion and development are ongoing at the Canyons Ski Resort, Park City Mountain Resort, and Deer Valley Resort located in Summit County. New development is also being planned on Bonanza Flat in Wasatch County with ski lifts and ski terrain connections to Park City and Deer Valley. Development adjacent to Snowbasin on private lands is anticipated over the next several years.

Statewide Visitation Trends

Total skier visits in Utah are forecasted to grow from around 3 million currently, to over 4 million by 2007. The forecast annual growth rate of 3.4 percent per year is almost twice the recently experienced rate of 1.8 percent per year since 1985. The major reason skier visit growth to 2007 is expected to grow more rapidly than since 1985 is that Utah's skiing age population will grow much more rapidly than it has since 1985. Destination skier visits are expected to grow a bit more rapidly to 2007 at 3.1 percent per year. This is somewhat higher than the trend anticipated nationally. (USDA Forest Service. 1999d)

Skiing in Utah has been on a steady growth path the last four decades. From a couple of hundred thousand during the early 1960s, skier visits in Utah have grown to over 3 million in the late 1990s. While the overall Utah ski market has been growing, the structure of the market has been changing. Skiing in Utah has evolved from a predominately resident day outing activity to more of a destination week long vacation. By the 1990s, destination tourists made up 55 – 60 percent of the skier visits (USFS Forest Service. 1999d).

Descriptions of Recreation by Ranger District

Each Ranger District on the Wasatch-Cache offers unique recreation opportunities dependent on the physical setting, access systems, customer preferences for different types of recreation, and the relationship of recreation to other uses or management concerns. The following profiles are meant to provide a short description of the variety in recreation with some observed trends for the Ranger Districts on the forest. The variety and amount of recreation is considerable compared to most other national forests. (See Landscape for descriptions of physical settings within which recreation occurs.)

Salt Lake Ranger District

The Salt Lake Ranger District (SLRD) manages recreation use in the Central Wasatch, North Wasatch-Ogden Valley and the Stansbury Management Areas. Managers consider three distinct areas on the district: the Wasatch Front, Davis County, and the Stansbury Mountains.

Recreation use along the Wasatch Front is seasonal with distinctive peaks in both summer and winter. Summer use occurs from May to October, with a shorter season at higher elevations. Popular activities include hiking, camping, backpacking, driving for pleasure, fishing, and mountain biking. Local watershed protection regulations preclude horses and dogs from most

Wasatch Front recreation areas. Winter use occurs from early November until April and popular activities include alpine/cross-country/nordic/backcountry skiing, snowboarding, snowshoeing, snow play, and helicopter skiing.

Recreation use in Davis County and the Stansbury Mountains also occurs year-round. The majority of use occurs during the summer, from May to October. Popular activities include hiking, mountain biking, equestrian use, OHV use, hunting and camping. Winter use occurs from November to May and includes primarily snow machine use, however, minimal backcountry skiing, snowboarding, snow shoeing, cross-country and nordic skiing occur.

Access Systems

The SLRD is adjacent to the Wasatch Front urban center. Year round recreation areas are accessed by State Highways and Scenic Byways 210 (Little Cottonwood Canyon, LCC), 190 (Big Cottonwood Canyon, BCC) and Salt Lake County Road Mill Creek Canyon, which is managed through a partnership with Salt Lake County. Visitors can also access the SLRD on several Scenic Backways including Immigration Canyon, East Canyon (SR 65), Farmington Canyon, Skyline Drive, Ward Canyon, and South Willow Canyon.

SLRD also provides approximately 344 miles of system trails. This system includes motorized, non-motorized, and Wilderness trails as well as four miles of winter groomed ski trails.

Notable Areas of National/Regional Significance

The SLRD manages all or part of four Designated Wilderness areas: Lone Peak, Twin Peaks, Mount Olympus, and Deseret Peak. The Great Western Trail and the Bonneville Shoreline Trail are also part of the district. There are also four major downhill ski areas on National Forest System lands managed by the SLRD.

Demand

Over the past several years, recreation use has increased, particularly along the Wasatch Front. Traffic counts in LCC indicate a growth rate of approximately 2.9 percent over the last 20 years. In BCC there has been a growth rate of approximately 3.1 percent over the last 21 years. Salt Lake County, directly adjacent to the District, was receiving 30 percent of the state's growth in 1996. The population there is expected to grow from approximately 820,000 to 1,000,000 people by the year 2010. Much of the projected growth is anticipated in Sandy (20 percent) and Draper (20 percent), which are adjacent to Big and Little Cottonwood Canyons.

High existing use levels, the proximity to a large urban population base, and the projected population increases all combine to create management concerns. Currently, managers deal with increasing and often intense user conflicts as well as issues regarding recreation management and facility development in a culinary watershed. Domestic animal management issues have increased as population increases.

Developed Recreation

There are a total of six developed campgrounds on the SLRD. Two are located in BCC, two in LCC, and two in Davis County. SLRD also provides 10 picnic areas, three interpretation sites, and 10 developed trailheads and a visitor information/interpretive center with a barrier free trail

at Silver Lake. In the winter, the SLRD administers special use permits for four alpine ski areas, one nordic ski area and one heliski operation. The ski resorts also provide a range of undeveloped and developed-site summer recreation opportunities including lift and non-lift served hiking and mountain biking as well as interpretive and educational programs. Developed opportunities for fishing are provided in BCC at the Silver Lake Boardwalk and in Mill Creek Canyon at the Terraces Boardwalk.

Undeveloped Recreation

Undeveloped recreation occurs in all three areas of the SLRD: Wasatch Front (primarily the tri-canyons), Davis County, and the Stansbury Mountains, with the majority of use in the tri-canyons adjacent to Salt Lake City. Hiking and mountain biking are the primary recreation opportunities along the Wasatch Front in the summertime. Opportunities for fishing are provided in LCC, BCC and Mill Creek. OHV and equestrian use are permitted in some areas where there is no conflict with watershed regulations. The Stansbury Mountains provide the best opportunities for undeveloped camping and equestrian use on the District.

In the winter, backcountry skiing, snowboarding and snowshoeing are the primary uses and are concentrated along the Wasatch Front. The SLRD manages three outfitter and guide permits for winter backcountry skiing. These uses all appear to be growing. Davis County and the Stansbury mountains receive substantial OHV and snow machine use.

Kamas Ranger District

The Kamas Ranger District (KRD) manages uses on a portion of the Western Uintas Management Area. July through September is the busiest season on the District, with campgrounds full nearly every weekend. Popular activities include camping, scenic driving, rock climbing, hunting, fishing, hiking, horseback riding, and backpacking. Winter activities that visitors enjoy include snowmobiling, snowshoeing, and cross-country skiing. There are two permitted organization youth camps and two outfitter and guides that provide youth at risk programs,

Access Systems

The KRD is within one hour of the Wasatch Front urban center and is immediately adjacent to numerous small towns and rural areas in Summit and Wasatch Counties. State Highway 150, Mirror Lake Highway, is a designated State Scenic Byway, which provides the main arterial access into the heart of the KRD. There are approximately 270 miles of system trails including motorized, non-motorized, Wilderness, and winter groomed ski and snowmobile trails.

Notable Areas on the District of National/Regional Significance

The KRD is the western portal to the High Uintas Wilderness. This is the closest high elevation access point from the heart of the Wasatch Front urban center. The Mirror Lake Scenic Byway, a Forest Service Fee Demonstration Area, also bisects the KRD. The Bald Mountain National Recreation trail provides visitors opportunities for a short steep hike with exceptional views of the surrounding landscape. Bald Mountain stands at the juncture of four of the most productive watersheds in Utah.

Demand
Over the past several years recreation use has increased, particularly along the Mirror Lake Highway corridor. Much of this use is spilling over from the urban areas of the Wasatch Front. Weekend activities are the most prominent. Group recreation sites continue to be very popular.

Developed Recreation
The KRD has 16 developed campgrounds along the Mirror Lake Highway. In addition, there are two campgrounds at the Smith and Morehouse area in the Weber River drainage on the northern edge of the KRD. There are also four picnic areas, nine trailheads and several interpretive sites.

Undeveloped Recreation
Undeveloped recreation management along the Mirror Lake Highway corridor has begun to emphasize more designated and hardened undeveloped areas to protect resource and social settings and provide for RV camping. Side routes and canyons continue to remain more open to user selected undeveloped sites. In winter, the Mirror Lake Highway is closed at the Soapstone Basin Road turn-off about 14.5 miles from Kamas. The remaining roadway and the Soapstone road are groomed for snowmobile traffic. The district also grooms the very popular Beaver Creek Ski trail along the highway. Three winter backcountry ski huts are under special use permit providing overnight backcountry and educational opportunities.

Evanston and Mountain View Ranger Districts

The Evanston and Mountain View Ranger Districts (E&MVRD) are managed as one district. They manage a portion of the Western Uintas and the entire Eastern Uintas Management Areas. These areas are the farthest from the Wasatch Front urban center with parts of the Mountain View District in Wyoming. With a relatively short season of warm weather, campgrounds and trailheads are full most weekends during July, August, and September. Popular activities include camping, fishing, horse use, hiking, backpacking, and ATV and mountain bike riding. In the fall, hunting season for two states (Utah and Wyoming) and four species of big game is a huge impact. With the change in technology of the snowmobile industry in the last 10 years the snowmobile use on the west side of the district is very large. The E&MVRD provide a full grooming program for both snowmobilers and cross-country skiers. Yurt and cabin rentals are also offered.

The North Slope of the Uintas is a relatively gently rolling slope with elevations ranging from 8,000 to 10,000 feet up to the High Uintas Wilderness. This Wilderness is comprised of steeper slopes dotted with high mountain lakes and streams with elevations of 10,000 to 13,580 feet.

Lodgepole pine dominates the landscape, with significant areas vegetated with aspen or sagebrush communities. At higher elevations, Engelmann spruce and subalpine firs are the most common trees, with Douglas fir in isolated pockets. The landforms and soils are the result of massive uplifting followed by centuries of glaciations and erosion.

Access Systems
The west side of the district is within 1½ hours of the Wasatch Front urban center via the Designated State Scenic Byway, State Highway 150, Mirror Lake Scenic Byway. Travel time

increases to 2½ to 3 hours from the Wasatch Front the further east visitors' travel on a combination of Interstate 80, county and state highways, and graveled county and forest roads. In the winter, travel is longer as the Mirror Lake Highway is not plowed open.

There are approximately 500 miles of system trails including motorized, non-motorized, Wilderness, and winter groomed cross-country ski and snowmobile trails.

Notable Areas on the District of National/Regional Significance
The districts are the gateway to the heart of the north slope of the High Uintas Wilderness. They provide a very popular main access point to the highest peak in the state of Utah, Kings Peak at 13,584 feet. The E&MVRD are also considered part of the National Petroleum Showcase. The Mirror Lake Scenic Byway and Fee Demonstration Area are also part of the districts.

Demand
Over the past several years recreation use has increased, particularly along the Mirror Lake Highway corridor. Much of this use is spilling over from the urban areas of the Wasatch Front. Weekend activities are the most prominent.

Developed Recreation
There are nine campgrounds on the Evanston side of the District, with seven campgrounds along the Mirror Lake Highway. There are an additional five campgrounds on the Mountain View side of the District. Fifteen trailheads ranging from very small to fully developed campground facilities provide access throughout the north slope of the Uintas. Most of these trailheads provide access to the High Uintas Wilderness for hikers and equestrian users as well as summer ATV and mountain biking use outside of the Wilderness areas. Three picnic areas and six interpretive sites are also scattered across the districts.

Undeveloped Recreation
Undeveloped recreation opportunities are widespread across the District, primarily due to the ease of terrain: Undeveloped sites are abundant on most of the districts, with well over fifty concentrated use areas. These uses range from motorized recreation to mountain biking and hiking, watercraft and fishing, hunting and ATV use. In winter, some trailheads provide access for winter snowmobiling, cross-country skiing with three groomed areas, and snowshoe use.

Ogden Ranger District

The Ogden Ranger District (ORD) is located adjacent to the northern edge of the dense population areas of the Wasatch Front. The ORD manages parts of the North Wasatch-Ogden Valley, the Bear, and the Box Elder-Cache Management Areas. Recreation management is complicated by the extensive amount of intermingled public and private land ownership. The ORD is primarily a day-use area. May through September is the busiest season on the District, with developed facilities full every weekend. Popular summer activities include camping, scenic driving, hiking, biking, boating, swimming, bird watching, hunting, and fishing. Winter activities include snowmobiling, ice fishing, downhill and cross-country skiing. Pineview is managed as a day-use reservoir with restriction on camping.

Access Systems
The majority of the district is within one hour of the Wasatch Front urban center. The primary access route is State Highway 39 up Ogden Canyon and over Monte Cristo. Minor access points are from Interstate 84 over SR 167, Trappers Loop, or County Road 166 over North Ogden Divide. System trails just outside of the Ogden City limits are in significant demand for day use. Some of these miles of trail are on private property. Trails around Snowbasin Ski Area are also very popular.

Notable Areas on the District of National/Regional Significance
Pineview Reservoir with the adjacent shoreline and developed sites is the most heavily used recreation site on the WCNF.

Demand
Recreation use has increased slowly every year. Customer surveys have shown Most of the users are from the urban areas of the Wasatch Front. Nearly all of the recreation use comes from a five county area around Ogden.

Developed Recreation
There are thirteen campgrounds, one picnic-ground, two marinas, three swim beaches, two fisherman parking, eleven trailheads, and two overlooks on the ORD. Most of the developed sites are located in either the Pineview Reservoir, South Fork of the Ogden River, and Causey Reservoir. Pineview is the highest use recreation destination in northern Utah and is managed as a day-use area with overnight stays in developed campgrounds only. All campsites are full every Friday and Saturday night. Weekday use is approximately one-half that of weekend use. Developed recreation facilities under concession operation generate one of the highest annual revenues in the nation. A significant amount of the revenue is from second vehicles that come in after the primary recreation site user, and pays an additional fee.

Snowbasin Ski area is under permit and affects 1850 acres of National Forest System Lands as well as adjacent private property. Snowbasin was a venue during the 2002 Winter Olympic Winter Games. There is authorization in concept for development of a four-season destination resort.

Undeveloped Recreation
Undeveloped recreation occurs along most of the paved and natural surface roads in the District. Hardened undeveloped areas, to protect resources, have been provided in the Monte Cristo area near State Highway 39. Many of the inventoried undeveloped sites are used only during the big game hunting season. In winter, most of the Monte Cristo and Curtis Creek areas are extremely popular for snowmobiling. The snowmobile trailhead at Monte Cristo is one of the highest use winter trailheads in the state.

Logan Ranger District

The Logan Ranger District (LRD) manages most of the Cache-Box Elder and part of the Bear Management Area. The LRD shares management of these areas with the Ogden Ranger District.

The LRD is located in Cache Valley, Utah with a population nearing 80,000. It is within a 1.5-hour drive from the Wasatch Front urban center.

Visitors to the LRD participate in world-class rock climbing, mountain biking, horseback riding, canoeing, kayaking, as well as the more traditional uses like hunting and fishing. Some of the best snowmobile high-marking and touring in the country, cross country skiing, and telemark skiing are also found here.

Access Systems

Highway 89, a Scenic Byway and major north/south transportation route, is a very popular scenic drive, which links this area with Jackson Hole, WY and Yellowstone National Park. Hardware Ranch Utah 242, a Forest Service Scenic Backway provides for travel along the southern and eastern portion of the District, linking back into Highway 89 just before it drops down to Bear Lake. There are approximately 25 motorized access points onto the LRD providing travel on about 297 miles of roads. There are an additional 59 miles of motorized trails, 136 miles of non-motorized trails, and 85 miles of Wilderness trails. In the winter, the LRD and the ORD also share about 150 miles of snowmobile trails groomed by the State of Utah.

Notable Areas on the District of National/Regional Significance

The portion of Highway 89 which bisects the LRD is a regionally significant travel way. It was designated a National Forest Scenic Byway in 1989, a State of Utah Scenic Byway in 1990 *and a National Scenic Byway in 2002*. Approximately $600,000 of Federal Grant, private and local government funds were invested in interpretation and additional visitor services in this stretch of highway in 1998 and 1999 with the project completed in 2000. The LRD also manages two designated Wilderness areas, the Mount Naomi Wilderness and the Wellsville Mountain Wilderness. Within the Mount Naomi Wilderness is the Mount Naomi Peak National Recreation Trail that takes visitors from a low elevation trailhead in Cache Valley to the popular Tony Grove recreation area. The Great Western Trail also traverses the district providing a regionally significant trail travel corridor.

The LRD also contains a regionally significant biodiversity corridor, thought to connect ecosystems to the north and south. More locally significant are the cliff walls of Logan Canyon, home to many endemic plant species as well as world-class rock climbing routes.

In the winter, the LRD is nationally known for its snowmobile opportunities. The complexes of groomed trails shared with the ORD have been rated among the top 15 areas in the west and is considered the most popular area in the State of Utah.

Demand

Over the past several years, recreation use has increased all over the district. More and more visitors are spilling over from the Wasatch Front. Developed recreation sites are generally full on weekends from July to September. In the summer, motorized use has increased dramatically with recreation ATV riding increasing in popularity. Rock climbing remains a popular activity, but the pioneering of new routes is decreasing. Horse use also remains popular, with local users requesting new facilities to increase resource protection. In the winter, snowmobile use has boomed with trailheads full every weekend. Visitors come from all over the country for the fine

powder and steep slopes. As the popularity has increased, so has the season of use with riders sledding in marginal conditions. Telemark and cross country skiing remain popular, although conflicts with other uses have affected the opportunities provided and skier experiences.

As technology advances and the population grows, use patterns appear to be changing. Aging campgrounds on the LRD are not sized or suited for the larger vehicles visitors now drive. Snowmobiles and ATV's power up slopes and through vegetation not previously explored. Backcountry skiers go further, stay out longer, and attack steeper terrain than previously. Fishermen read about and visit the Logan River more frequently. Rock climbers visit for the 5.11+ rated routes.

There is no longer an off-season. In some areas, springtime hikers compete for parking space with skiers and snowmobilers. Kayakers play in sections of the Logan River along with the fishermen. Summer campers are increasingly accompanied by OHV's. During the fall, visitors drive the area and stay to view the fall colors, while others are road hunting for deer or elk. Hunters seem to be doing less camping and more day hunts using ATV's. As winter approaches, snowmobiles and ATV's share the same trails to hunt or recreate. Full parking lots on weekends have displaced some snowmobiles to weekdays or nighttime. As the local population increases homes are being built ever higher on the benches, eliminating winter range and increasing recreation (and Wilderness) trespass along the Cache Valley front.

Developed Recreation

There are 15 campgrounds providing a variety of family and groups sites for day and overnight use. Two are along the northeast district front, 10 are up Logan Canyon, two in Blacksmith Fork Canyon, and one in Box Elder County. There are also nine picnic and day use sites, seven interpretive sites, and 17 developed trailheads. Tony Grove Lake is the most popular summer attraction with camping, fishing, canoeing, and hiking the favored activities.

Undeveloped Recreation

Undeveloped recreation is very popular on the LRD. Most of the camping sites are associated with the extensive road system. Almost 500 undeveloped vehicle camping sites have been inventoried by the LRD. The majority of these sites occur in the bottom of drainages along or in riparian areas. Low elevation sites are popular in late spring. As summer temperatures reach 90 to 100 degrees and upper elevations dry out, campers tend to move to the shade in the higher elevations.

Popular summer activities include hunting, fishing, hiking, mountain biking, horseback riding, and viewing scenery and wildlife. The greatest increase in an activity with significant potential resource impacts is recreational riding of OHVs. Many visitors come to camp and bring OHV's to tour the areas. Some are familiar with where they are and some are not. Many travel off of designated open routes due to lack of adequate signing or because designated routes do not take them where they want to go.

In the winter, snowmobile touring, snowmobile highmarking, crosscountry skiing, and telemark skiing are very popular. Snowshoeing is a growing activity, while many scout groups visit for camping in snow caves. Conflicts between skiers and snowmobilers have been a concern for a

number of years. The district does provide for separation of uses in a few areas, but repeated violations by the snowmobilers of areas closed to motorized use have displaced some skiers and negatively affected the opportunities and experiences of others.

Environmental Consequences

General Effects

This section discusses effects on recreation from the following activities: Recreation, Road and Access Management, Vegetation and Fuels Management, Livestock Grazing, Inventoried Roadless Area Management, Wildlife Management, Soil,Water, Aquatic and Semi-Aquatic Species Resources Management, Threatened, Endangered and Sensitive Species Management, Special Management Areas, and Oil and Gas Activities. Also discussed are environmental consequences for ski areas that include effects from Roadless Area Management, Fire/Vegetation Management, Scenery Management, Wildlife and Fisheries Management, and Watershed and Soil Management.

Many of the issues raised through public comment involve conflicts between recreation users. These issues are addressed in the section titled Effects on Recreation from Recreation which is divided into major topic areas: General Effects, Summer Recreation, Winter Recreation, Ski Area Expansion, and Heli-skiing.

Many comments have been received regarding conflicts between users on travel ways, particularly trails. Examples of the conflicts are hikers who do not like the sight, sounds, uneven tread surfaces, smells of horses, bicyclists, and motorized users; horseback riders who are concerned with personal and stock safety when approaching hikers and motorized users; and bicyclists who are concerned with safety from meeting other users on a trail. Although these are important issues they are not addressed in this FEIS because the issues are more appropriately addressed for specific trails or travel ways during travel mangement planning. Under all alternatives, the Forest Plan recognizes this issue by providing Goals and Objectives aimed at working with users to reduce or resolve these types of conflicts.

One of the issues identified through public comment is what levels of user densities we should manage for in the future and where. User densities are not established in this analysis, however, the issue is addressed through the summer ROS by identifying ranges of user densities for some opportunity classes. These density ranges are thresholds which when reached will trigger a public process for deciding on a site by site basis whether and how to limit recreation user densities.

Effects on Recreation from Recreation

General Effects

Given population growth and advances in technology, the trend is for recreational uses of the Forest to occur on an ever-increasing portion of the WCNF. These uses generally have some level of impact to the natural environment. Impacts are quite varied and may depend on timing of the use, sensitivity of the location, use intensity and specific behaviors of recreationists.

Management decisions to allocate different parts of the WCNF to different management prescriptions will affect recreation uses to some degree in all alternatives. Effects to recreation opportunities are generally related to allowed activities that could result in changes in the natural setting and/or in the levels and types of access.

The differences between alternatives and the relationship of these to current recreation opportunities for summer are displayed as acres of the various ROS summer settings in Table REC-11 and Figure REC-11. Appendix D-2 contains full descriptions of each of the seven Recreation Opportunity Classes.

Table REC-11. Acres of Summer Recreation Opportunity Classes: Existing Conditions and Alternatives

ROS Category	Alternative and Existing Condition (EC)							
	1	2	3	4/1985	5	6	7	EC
Wilderness/Primitive[1]	36,500	36,500	36,500	307,500	36,500	36,500	36,500	36,500
Wilderness/SPNM[2]	272,400	272,400	272,400	0	272,400	272,400	272,500	272,500
SPNM[3]	556,200	436,300	392,100	241,900	308,400	411,800	416,100	416,100
SPM[4]	135,800	188,700	223,600	85,600	268,800	201,400	276,800	276,800
RN(Roaded Natural)	234,600	301,500	311,100	545,600	349,300	313,400	227,900	233,600
Rural	720	720	720	13,600	720	720	6,400	720
Urban	144	144	144	0	144	144	144	144
NA[5]	0	0	0	45,200	0	0	0	0
TOTAL[6]	1,236,364	1,236,264	1,236,564	1,239,400	1,236,264	1,236,364	1,236,344	1,236,364

[1] Wilderness (MPC 1.1).

[2] Wilderness Semi Primitive Non-Motorized.

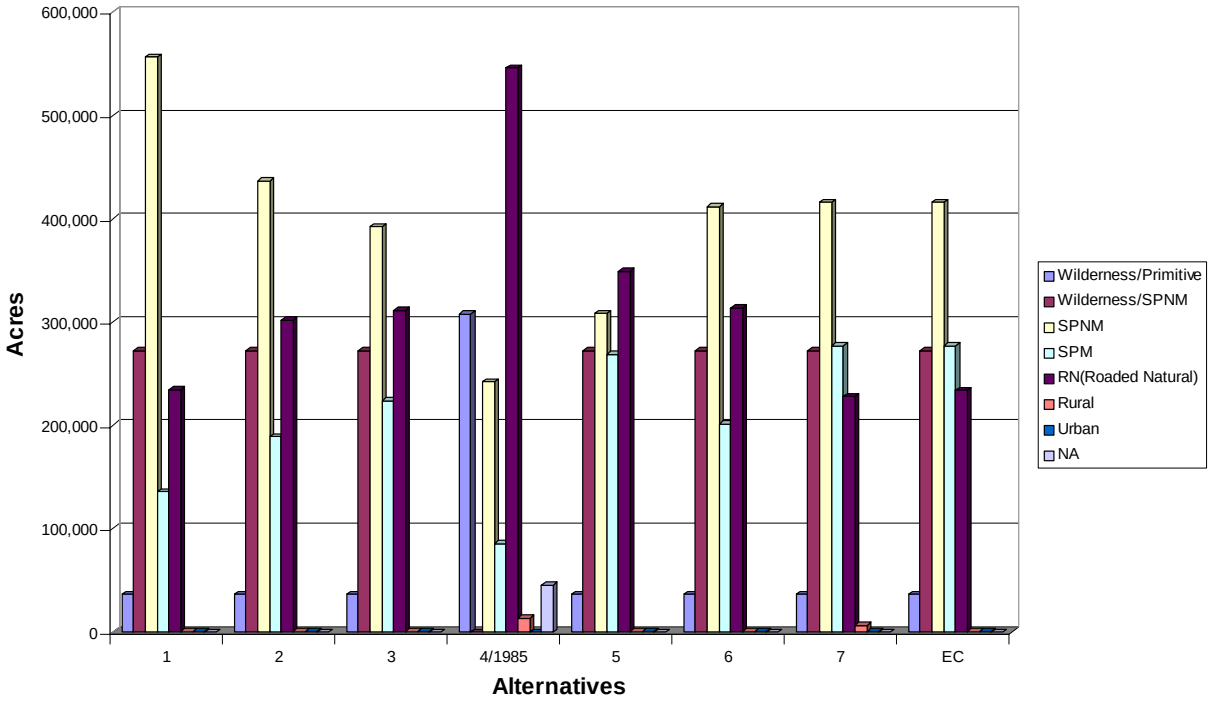
[3] Semi-Primitive Non Motorized and Recommended Wilderness (MPC1.5).

[4] Semi-Primitive Motorized.

[5] Lands acquired after 1985 plan.

[6] Totals differ due to GIS Mapping accuracy and rounding.

Figure REC-3. Acres of Summer ROS: Existing Condition (EC) and Alternatives



Note: Existing condition is not shown in graph. See Table Rec-12 for existing condition acres.

Recreation use (type and density of users) has an impact on the social and biophysical setting that can affect recreation opportunities and experiences. Under all alternatives recreation use and demand are expected to continue to increase. This increase, and changing demographics, may be accompanied by demand for a greater diversity in outdoor nature-based recreation opportunities. Emerging technologies will continue to create new uses with often new or unknown impacts. Effects of recreation use on the natural setting depend on facilities, site mitigations, user behaviors, user densities, site capability, design and many other factors. Based on the any one of these factors impacts to the natural setting can vary significantly.

Conflicts among users may increase as available space becomes more crowded, where incompatible uses are not separated, or where desired opportunities are not available. However, new technology, such as quieter, cleaner running motors, might be used in the future to actually reduce conflicts between users. Also user behavior could be modified to reduce some types of conflicts. Because desired uses vary considerably, each alternative has advantages for certain groups of users while being less desirable for other groups. Conflicts between uses and natural resources protected by existing legislation (e.g., ESA, Clean Water Act, Federal Cave Resources Act of 1988) must be managed in accordance and through consultation with the appropriate entity such as the US Fish and Wildlife Service. Alternatives vary in the potential for these conflicts depending on which activities are allowed and where.

Finally, whichever alternative is selected, management actions must be developed to fit within the mapped ROS category, management prescriptions, and to move toward the Desired Future Conditions for a given management area.

Because of the diverse desires for outdoor recreation activities, recreational experiences may be affected by behavior or mode of travel by other recreational users in the same area. Examples of these effects are: mountain bikes and hikers, equestrian, biking and hiking, ATVs and hiking, fly fishing and water craft, alpine skiing and snowboarders, to name a few. Non-motorized recreationists seeking solitude from the noise of motorized activities or people desiring group or family associations may conflict with individuals seeking solitude or testing their independence and backwoods skills.

Because of the need to maintain existing recreation facilities, developed recreation capital investments are most likely to be applied to reconstruction of existing facilities rather than construction of new recreation sites. This is true for all alternatives even though Alternatives 4 and 5 allow for new facility development on more total acres than the other alternatives. All alternatives provide sufficient acres for new development to meet increasing demand except Alternative 1, which allows no new recreation development. With the high use levels currently at existing sites, further deterioration is likely. The most popular sites are already at design capacity and well exceed operational capacity on weekends and holidays (Table REC-5), while vacancies remain during other times. Development of new sites could help meet demand from the growing population, but may not reduce the over utilization of popular sites. Without an increase in developed settings visitors may be displaced during peak use periods. Typically these displaced visitors seek their preferred experience in an undeveloped site in the immediate vicinity of the developed site. This increases the potential for resource damage in the surrounding area and the impacts to other visitors.

Funding sources, in addition to appropriated dollars, are being used to improve or maintain to standard, developed recreation sites. Concessionaires, through special use permits, currently manage 97 percent of the developed recreation sites of the WCNF. This provides service to visitors and returns a portion of the fees collected in the form of heavy maintenance on facilities. Fee demonstration areas such as the Mirror Lake Scenic Byway and partnerships like Mill Creek Canyon also help the USFS improve developed recreation sites' quality by charging user fees and returning the money collected to protect the resources impacted by the uses. These funding sources are expected to continue and would be common to all alternatives.

Undeveloped recreation includes activities that occur outside of developed recreation areas in concentrated use areas where the objective is to protect and stabilize natural resources. It includes activities such as driving for pleasure, camping, hiking, viewing scenery, hunting, fishing, skiing, snowmobiling, horseback riding, mountain biking, ATV riding and rock climbing to name a few. These uses will continue to increase in intensity and resource impacts in all alternatives because of population growth.

Historically there has been a fairly clear distinction between "developed" and "undeveloped" recreation. However as user numbers continue to increase without concurrent increases in traditional developed facilities (such as campgrounds and picnic areas), the need for some kind of site development to protect resources in heavily used undeveloped camping and play areas

arises. Some increased use from undeveloped camping is due to overflow from developed campsites, but most is the preferred experience of the visitor. As visitors are displaced by other users competing for the same space, they may move to undisturbed areas expanding impacts to vegetation, watershed, and wildlife resources. Conflicts with resources result when preferred activities impact sensitive plants, animals, or watersheds. Site development could include such actions as hardening and designating existing undeveloped campsites to reduce impacts to soil and vegetation resources or installing toilets to address sanitation issues. More of this type of action is expected in the future with all alternatives except Alternative 1. Where these actions would occur varies by alternative mapping of prescriptions, in particular Prescriptions 4.4, 4.3, and 4.2. These actions may further displace some visitors who prefer little or no evidence of management. However if design of sites involves frequent forest users, we can reduce the displacement potential. Alternative 1 would have the greatest effect on undeveloped campers and other undeveloped activities because when impacts become excessive the site or area would be closed and rehabilitated.

Trails are important to undeveloped recreation use. They are critical for access to desired areas and often provide linkages to local communities. Maintenance levels affect speed or safety of travel while directional or informational signing affect visitor convenience, security, and dependence on self-reliance. New access points increase recreation use long term and increase impacts to previously undisturbed areas. There is no difference between alternatives with regard to total miles of trail open to foot and horse travel, however alternatives do differ in the miles of designated open routes for summer travel by vehicles, both motorized and mechanized. The primary difference is related to the amount and location by alternative of lands recommended for Wilderness and mapped as prescription 1.5. Trails within these areas that are currently open to mountain bikes, motorcycles, and/or ATVs would be closed to these uses but continue to be open for foot and horse travel. Table REC- 13A later in this section under the heading “Effects on Recreation from Inventoried Roadless Area Management,” displays the mileage affected in each alternative. This change could put additional pressure to allow or continue motorized or mechanical uses on other public or private lands. A reduction in available trail miles could also increase the density of those uses on trails remaining open to them, and may also increase user conflicts and management needs.

Trails can impact other resources by increasing sediment and pollutant delivery, affecting water and aquatic habitat quality. They also can fragment terrestrial habitat impacting some terrestrial species. Trails are also known vectors of dispersal for noxious and invasive weeds.

Recreation activities provided under special use permits occur in both developed and undeveloped recreation settings and involve both motorized and non-motorized opportunities. These uses do not vary by alternative with the exception of heli-skiing, which is discussed later in this section.

There is no difference between alternatives with regard to effects on the 351 currently permitted recreation residences. Management of these areas under permit must be consistent with direction contained in the Revised Forest Plan.

Summer Recreation

One of the main issues in recreation is the conflict between the experience of the non-motorized users when motorized use occurs nearby and when motorized users are in areas where they are not allowed. Non-motorized users do not like noise or the presence of motorized vehicles when they are experiencing outdoor activities and they do not like to see tracks, damage to the land, or hear the sound of motorized vehicles in areas where they are not allowed. The issue with motorized users is generally that they can cover significant distances relatively quickly and they do not want any reduction in the open-to-motorized routes. They often would like to see more trails available and more opportunities on loop travel ways. All Alternatives provide for motor vehicles allowed only on designated-open roads and trails.

The amount of trails and roads reduced in the alternatives is because of Recommended Wilderness. Alternative 1 would close 2 miles of roads available for motorized use. Of the 306 miles of trails that currently are open to motorized vehicles, 76 miles under Alternative 1 would be closed while Alternative 2 would close 7 miles.

The majority of non-motorized and motorized use occurs on roads and/or trails. Therefore acres of a particular recreation setting are not a good measure of differences between alternatives. Rather, miles of motorized and non-motorized routes (roads/trails) are a better way to compare differences between alternatives.

ROS provides guidance on how roads could be maintained and the resulting type of use for travel planning in the future. The ROS classification encourages a particular maintenance level for a road and a distinction is made in travel ways, by the design and ability to allow passenger car travel. In the State of Utah licensed vehicles can drive on all roadways that allow travel, whereas unlicensed vehicles are only allowed on primitive roadways that are not designed or maintained for passenger car travel. In all of the alternatives SPM denotes travel ways that are not maintained for passenger car use (primitive) and the area of SPM changes by alternative. Currently there are approximately 1,050 miles of primitive road (unlicensed vehicle are allowed) and approximately 500 miles of better than primitive roads that are design and managed for passenger car use under Forest Service jurisdiction on the Forest. Alternative 1 reduces primitive roads by two miles and in all of the other Alternatives the total miles of roads are not reduced, all though, the ROS category may be different. The key thing to understand is that the existing road and trail system is not affected by ROS except the guidance of how a road could be maintained as primitive or better than primitive. Trying to evaluate the Alternatives by the number of acres of ROS category can be somewhat misleading because the acres do not reflect the number of travel ways or tell you the entire characteristic of the travel way that lies in a ROS category area. The best way to compare the amount of change between the alternatives for ROS is by a visual evaluation of the ROS maps by Alternative compared to the existing condition.

In a visual comparison Alternative 7 manages the entire Forest the same as the existing condition except for the Ski Resorts where management changes from Roaded Natural to Rural because of anticipated higher day use such as mountain biking and hiking. For W/P and W/SPNM the Forest is being managed the same in all Alternatives except Alternative 4/1985 Forest Plan where the entire Wilderness was managed in W/P. For Urban and Rural ROS categories the

Forest would be managed the same in Alternatives 1-3 and 5-7 except on the slopes of ski areas in Alternative 7 as noted above and Alternative 4/1985 Forest Plan. There are no Urban areas in Alternative 4/1985 Forest Plan and part of the Rural areas coincide with the existing condition around Pineview and at the ski resorts. Other Rural areas are found in Ogden Canyon, Logan Canyon around the campgrounds, Mantua area, South Fork of Ogden Canyon, Causey Reservoir and the Soapstone area on the Kamas Ranger District in Alternative 4/1985 Plan. The effects of Alternative 4/1985 Forest Plan would be a higher level of facility development and social and managerial interaction in these areas. In the other Alternatives, the Rural areas outside of Pineview and the ski resorts are managed as Roaded Natural which has a lower level of facility development, etc.

The changes in Alternatives are marked by how roads, trails or areas could be managed by ROS categories. Alternative 1 has the greatest amount of SPNM because of lands recommended for Wilderness. See in this section “Effect on Recreation from Inventoried Roadless Area Management ” for information on trails and roads closed by Alternative. The effect of the Recommended Wilderness in Alternative 1 would be the increased probability of recreationists not being able to hear the sounds of motorized travel.

In the Eastern and Western Uintas Management Areas, Alternatives 2, 3 and 6 are similar because management in the North Slope, Kamas Front Range, Upper Setting and Cedar Hollow areas changes from SPM in the existing condition to RN. This change implies that roads in these areas would be managed at a higher maintenance level- for passenger cars as opposed to high clearance vehicles. Alternative 5 would make the changes mentioned previously and alsowould change the SPNM along the northern edge of the High Uintas Wilderness to SPM. Under Alternative 5 future project proposals could see an effect if new primitive roads are built. New roads would further expand the primitive road network resulting in acres of Wilderness potentially managed as W/SPNM. Alternative 4/1985 Forest Plan manages most of Eastern and Western Uintas Management Areas as RN except for Wilderness and the heart of the Lakes roadless area. The effect of Alternative 4/1985 Forest Plan is the potential reduction of primitive roads to comply with the RN characteristic of passenger car travel. The 1985 Plan envisioned many areas currently mapped as semi-primitive as being converted to Roaded Natural as a result of road construction associated with a large timber program. Alternative 1 changes the SPM of motorized trails to SPNM in MPC 1.5 recommended Wilderness areas.

The Stansbury Management Area’s east face is now SPM with some cherry stems of RN and is similar in the existing condition and for Alternatives 2-7 with some minor changes. Alternative 1 manages the area outside the Wilderness as SPNM except for some cherry stems of existing roads.

The existing condition and Alternative 7 manage the bench along the Wasatch Front from Ogden to Bountiful as SPM. In Alternatives 2,3, 5 and 6, these areas are managed as RN, which could reduce the amount of primitive roads on National Forest System lands. Alternative 4/1985 Forest Plan managed the bench as SPNM. If Alternative4/1985 Plan is selected, managers would need to determine if the existing Forest roads that are in SPNM would continue to be managed as SPNM or change to SPM. The Monte Cristo area of the NorthWasatch/Ogden Valley existing

road system is managed as SPM. In Alternatives 1,2,4,5, and 6 some these road systems would be managed as RN. Alternative 3 would manage the same area as SPNM.

Social Setting and User Densities

A more subtle difference between Alternatives, but important in light of ever-increasing numbers of users, is the implication of ROS mapping for social settings and future user densities. Within the ROS there are Recreation Opportunity Classes that are defined as implying some type of limits on numbers of users (See Appendix D-2). These are Wilderness/Primitive, Wilderness/Semi-Primitive Non-Motorized, and Semi-Primitive Non-Motorized. The Setting component "Social" for these Classes discusses various degrees of probability of solitude and evidence of other people. The Wilderness/Primitive Class only occurs within the High Uintas Wilderness and therefore is the same for all Alternative except Alternative 4, in which all Wilderness were mapped Primitive. The relative amount and location of the Semi-Primitive Classes varies by Alternative (see ROS Maps).

Given population growth and demand it is expected that many areas now meeting criteria for semi-primitive, without some type of management or restriction, would eventually exceed defined user densities. Opportunities for this type of experience would decrease over time. This situation is primarily true of areas accessible by road or trail and more so for roads or trails located close to population centers. It does not apply to inaccessible acreages well away from population centers or existing roads and trails.

The delineation of the Semi-Primitive Recreation Opportunity Classes puts in place a framework for future monitoring and management of user density levels. First, a baseline of actual user densities needs to be established for these areas. This is included in the Revised Plan Monitoring requirements. Then these findings need to be compared with the ranges for thresholds identified in the ROS Table in Revised Forest Plan Chapter 4a6. The actual thresholds for user densities that would trigger some kind of management action need to be tailored to the specific area. For example thresholds might be set higher for Semi-Primitive areas nearer population centers to accommodate the use patterns there and relatively lower for less accessible areas. The intent is to provide a conscious decision point on allowable user densities for some areas, rather than allowing user densities to grow unchecked everywhere as population grows. A number of options could be considered upon reaching identified thresholds. Education of users to modify behavior, initiation of permit systems, separation of uses in time (odd day/even day, etc.) and/or the option of amending the Forest Plan to change the ROS Class could be considered. A public process including users should be used to take these steps.

Winter Recreation

In winter, differences between alternatives and relationship to existing conditions are analyzed and displayed by available acres for Heli-skiing, Motorized, Non-Motorized, and Wilderness Non-Motorized uses (Table REC-12 and Figure REC-12). Alternatives reflect considerations including current District Travel Plan Maps, public comments on winter recreation conflicts, mapping of management prescriptions for each alternative, critical big game winter ranges, and mapping of existing winter motorized use. Recommended Wilderness acres (MPC 1.5) were mapped as non-motorized in winter in all Alternatives except Alternative 7. In this Alternative, MPC 1.5 areas currently open to winter-motorized use would remain open as interim

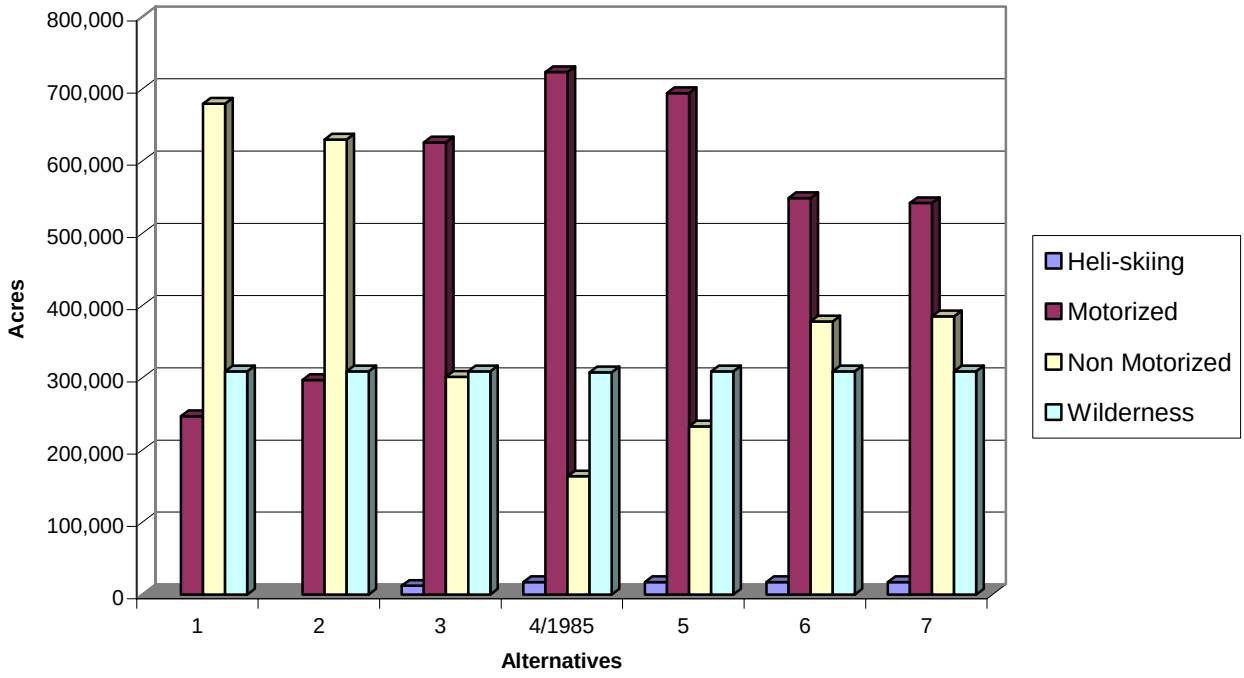
management and are mapped as winter motorized. The remaining MPC 1.5 areas in Alternative 7 are mapped as non-motorized.

Table REC 12. Acres of Winter Recreation: Heli-skiing, Motorized, Non-Motorized, Wilderness by Alternative and Existing Condition (EC)

Winter Recreation	Acres of Existing Condition and Alternatives							
	1	2	3	4/1985	5	6	7[1]	EC[2]
Heli-skiing	0	0	12,000	17,000	17,000	17,000	17,000	17,000
Motorized	246,800	296,700	663,600	723,300	693,900	548,700	540,700	634,800
Non-Motorized	679,200	629,800	263,000	163,400	232,600	377,900	385,900	291,600
Wilderness	308,900	308,900	308,900	307,500	308,900	308,900	308,900	308,900

[1] Alt 7 Allows motorized use in areas currently open within Recommended Wilderness (Prescription 1.5)
[2] Existing Condition

Figure REC-4. Acres of Winter Recreation: Heli-skiing, Motorized, Non-Motorized, Wilderness by Alternative



For winter recreation, conflicts occur primarily between motorized and non-motorized uses. Factors affecting these two groups of users include access to plowed parking, distance that can be traveled, steepness of terrain and nature of vegetation, and availability and depth of snow. Conflicts between winter users are most pronounced at shared trailheads where access is limited by snowplowing. With the large size of the newer snowmobile trailers, available parking spots

fill up quickly on weekends and holidays. Parking is discussed under "Effects on Recreation From Roads and Access Management". Snowmobilers can inherently cover very long distances not accessible to average non-motorized winter users. Therefore terrain closer to plowed parking, while required for both types of users, is especially important to non-motorized users.

Both groups do not equally perceive the winter use conflict. Some (though not all) non-motorized users are seeking a winter experience away from noise and emission of motorized equipment, while the non-motorized use itself generally does not interfere with the experience of the motorized user. Because of this, motorized users have expressed the desire to share terrain and avoid separation of these uses. They are concerned that closure of areas to separate uses will result in higher densities of motorized users in the remaining open areas. Given the rapid growth trend in winter motorized use, it is expected that motorized densities will be increasing even without any change in available acreage. In some instances, such as the Monte Cristo area of the Ogden Ranger District, motorized user densities are already a concern among users because of crowding and safety.

Non-motorized users have expressed the desire to have accessible terrain closed to motorized use so they can avoid the effects of motorized use (sound, smell, tracking of powder). Because of technology changes, terrain is no longer a major limitation for at least the most modern motorized equipment. Both groups are often seeking the same terrain, especially for untracked powder. Once an area is tracked by a snowmobile, the slope may be deemed un-ski able or at least undesirable by some backcountry skiers because of inconsistency between packed and powder snow making it difficult to ski.

In addition to winter motorized closures to provide separate non-motorized recreation opportunities, critical big game winter ranges are also closed to varying degrees by Alternative. See discussion under the section titled "Effects on Recreation from Wildlife Management" for a discussion of the relative proportion of total acres closed for this reason by alternative.

Effects on winter use are compared by the acres open and closed to snowmobiling and they vary by alternative **(**Table REC-12**).** Alternatives 1 and 2 are the most restrictive to motorized use reducing open areas by about 61% and 53% respectively from existing. Alternative 3 increases winter motorized access by about 4% over existing. Alternative 4 (1985 Plan) had about 12% more area open to motorized that currently exists in Travel Management Plans. Alternative 5 would open additional areas to motorized use adding about 9% to existing. Alternative 6 and 7 provide for some separation of uses to reduce conflicts reducing existing motorized areas by about 14% and 15% respectively. However, a large portion of the reduction (about 30,000 acres) is acreage along the very steep Wasatch Front of the Ogden Ranger District, which is currently "open", but not used by snowmobilers. Therefore the usable snowmobile terrain in the existing condition is actually about 5% less than the acres shown and alternatives that close this area (1,2,6,7) have a 30,000 acre reduction that has no real effect on snowmobiling..

Winter Recreation Maps (see Map Packet) show opportunities, by alternative, for specific locations. As described above, Alternative 1 provides the least motorized opportunities. No snowmobiling would be allowed in Roadless Areas or Recommended Wilderness areas (MPC 1.5). This would result in the greatest decrease in acres available for snowmobiling, while

providing the greatest potential acres for non-motorized winter recreation. Alternative 2 provides slightly more winter-motorized opportunities and similar potential to Alternative 1 for non-motorized. In this Alternative snowmobiling is allowed on designated routes in Roadless Areas, making it very restricted in these areas. These two alternatives would have the greatest impact on motorized users. There would be an increase in density of motorized users (especially considering the growth trend in this use) within the available area, increasing conflicts among users competing for the same terrain. These Alternatives would increase the area available for non-motorized winter, however given the distance most non-motorized users can travel (5-10 miles round trip generally is a maximum for people of moderate fitness) much of the area would not actually be accessible or used.

Alternative 6 and 7 maintain the majority of existing motorized opportunities and allow snowmobiling in Roadless Areas. Motorized use is not allowed in Recommended Wilderness (MPC 1.5) in Alternative 6 but is in Alternative 7, and both Alternatives close selected areas to reduce conflicts between motorized and non-motorized user groups. This change may result in some minor increases in density of motorized users however; a large portion of the reduction (about 30,000 acres) is acreage along the very steep Wasatch Front of the Ogden Ranger District, which is currently “open”, but not used by snowmobilers. Alternative 7 would not allow winter-motorized use in a specific area between the Bunchgrass and Steep Hollow drainages within the Mount Naomi roadless area on the Logan Ranger District. This would decrease winter-motorized opportunities in this area which is valued by both groups of users. However in the event of an emergency, snowmobilers will be allowed to traverse a route from the higher elevation open areas to the bottom through the closed area and out to the highway. Alternative 7 closes several areas in the Eastern Uintas Management Area and an area between the East Fork Bear and Stillwater Fork in the Western Uintas Management Area that are open now but not used by snowmobilers.

Alternative 3 provides for a small increase in motorized recreation but would not reduce conflicts with non-motorized users through separation. Alternatives 4 and 5 provide the most motorized winter use. They do not close any Roadless Areas and open some existing big game winter range closure areas. However, the same acreage along the Wasatch Front, Ogden Ranger District is included as open and because of steepness, it is not actually expected to be used. These alternatives provide the least separation of uses to reduce conflicts so non-motorized users would continue to have a less satisfying experience than if there was some separation.

Alternative 7 winter motorized mapping (developed after public comment on the other six Alternatives) was specifically responsive to conflicts and concerns in the Logan Ranger District. In addition to the area discussed above, it includes several delineations of non-motorized designed to provide for separation of uses while continuing to provide motorized access to higher elevation areas where snow is available to motorized users for a longer time period each year.

Ski area expansion

A main issue with ski areas is whether to allow or not to allow ski area expansion on Forest System land. Those that support ski area expansion would like to have it considered on a case-by-case basis instead of having a Forest Plan amendment to change the boundaries. Those that oppose ski area expansion are concerned with decreased visual quality, decreased aesthetic

qualities, loss of natural qualities, degrading watershed and wildlife conditions, and increased development that may accompany expansion of ski areas on Forest System lands.

Method of analysis for ski area expansion involves comparing alternatives if ski area expansion is allowed or not.

The allocation of additional lands for ski area expansion is provided in Alternative 5. All other alternatives provide continuation of permits with existing acreages. Generally, then, for Alternatives 1, 2, 3, 4, 6, and 7, effects to ski areas are very similar with no opportunity for expansion on National Forest System lands beyond existing permit boundaries. Ski areas might propose additional development within existing boundaries, but these are site-specific decisions (not Forest Plan decisions) addressed in Master Development Plans. Determination of consistency with Forest Plan direction is a requirement of all site-specific analyses.

Heli-skiing

The issue is the conflict in the experience between winter backcountry users and heli-skiers. Those that support heli-skiing believe that it allows for a diverse and balanced use of the land. Supporters feel that it does not harm the environment; noise is of minimal impact, is a safe means of providing backcountry ski experience and supports the local economy. Those who oppose heli-skiing say there are impact to wildlife, is enough opportunity for heli-skiing on private land, and it degrades the experience of winter backcountry users, particularly in the Tri-Canyon area. Method of analysis is to compare alternatives by the amount of areas where heli-skiing is allowed.

Alternatives 1 and 2 do not allow heli-skiing, due to locations of Recommended Wilderness. For all alternatives that allowed heli-skiing impacts from heli-skiing operations include noise levels affecting feeling of solitude and the amount of self-reliance necessary to access backcountry ski areas. Heli-skiing does provide an opportunity for skiers to enter the backcountry who might otherwise not be able to enjoy the benefits of the fresh powder slopes. In Alternatives 4, 5, 6, and 7, Heli-skiing is allowed as defined in the existing special use permit. Alternative 3 closes some areas and opens others, but has a reduction in acres as compared to the existing permit acres by opening Big Cottonwood Canyon in areas that are currently closed north of Butler Fork, and closes the Gobbler's Knob area.

Effects on Recreation from Roads and Access Management

Roads and access management play a major part in both developed and undeveloped recreation opportunities by affecting the type of experience a recreationist may desire. Existing District Travel Management Plans, road maintenance levels, non-motorized and motorized trails and public comments were used to map summer ROS categories by alternative. There is a direct correlation in the types of roads or trail administer by the WCNF and the ROS category. Roads with a maintenance level 2 are classified as primitive (i.e., the high clearance vehicles, rugged routes, allow non-license ATV use) and fit into the SPM category. Roads with higher maintenance levels are classified as better than primitive (i.e. surfaced, smooth, maintenance levels 3, 4, 5, designed and used by standard passenger cars.) and fit into RN – Urban categories. Therefore ROS provides guidance on how roads could be maintained and the resulting type of

use for travel planning in the present and future. In the State of Utah licensed vehicles can drive on all roadways that allow travel, whereas un-licensed vehicles are only allowed on primitive roadways that are not designed or maintained for passenger car travel. Changing the maintenance level of a road could have a negative effect on non-licensed recreation vehicle users and the routes that are available to them. Maintenance level also affects the type of experience described in an ROS category by changing the skill level requirement, speed, lack of loop and connecting routes and other sought after benefits. Trails on the other hand are either open to motorized travel or closed. All motorized trails are being managed as SPM and non-motorized trails are managed SPNM. In the following discussion a comparison of alternatives is made in how the changes in motorized routes would affect a recreationist and their desired setting and experience.

Summer Recreation

There are two differences between alternatives with regard to roads and access management's effects on summer recreation use they are, new road construction, and road and motorized trail closers.

First new road construction from timber harvest, and oil and gas exploration, and development would provide additional miles of road available for recreational access. Alternative 5 provides the most mileage with a projected 63 miles of new road construction. Alternatives 3 and 4 each provide 49 additional miles while Alternatives 6 and 7 provide 16 and 18 miles respectively. Alternatives 1 and 2 provide the least new roads with a projection of 3 and 9 miles respectively. The effects to recreation are the possible addition of more motorized travel ways and the increase of the sights and sounds of motorized use to those desiring a W/P, W/SPNM, and SPNM setting. Alternative 5 could increase the number of miles of road in timber harvest areas mainly in the North Slope of the Eastern Uintas Management Area and in the Cache-Box Elder and North Wasatch-Ogden Valley Management Areas around Monte-Cristo and Hardware Ranch. With the potential increase of miles of motorized routes SPNM and W/P and W/SPNM is affected in the North Slope and High Uintas Wilderness. By moving motorized routes in closer to the W/P boundary it could expand the area of W/SPNM during project level analysis. Road construction would affect Alternatives 3, 6 and 7 in the North Slope areas. Alternative 4/1985 Forest Plan would affect the North Slope, Cache-Box Elder and Wasatch-Ogden Valley Management Areas with the potential new construct of roads.

The second difference between alternatives for roads and access effects on recreation is the closure of roads as a result of Wilderness recommendation. Alternative 1 would close 2 miles of Roads available to motorized use. Of the 306 miles of trails that are currently open to motorized vehicles, 76 miles under Alternative 1 and 7 miles under Alternative 2 would be closed. There are no trail or road closer from Recommended Wilderness in the other alternatives. The effects of these trail and road closers would be the increase of SPNM area thus potentially expanding the opportunity of solitude from the sites and sounds of motorized travel in Alternatives 1 and 2.

Winter Recreation

The primary effect of roads and access management on winter recreation is the plowing of roads and parking for both motorized and non-motorized winter activities. Snow plowing of roads and parking is generally a jointly funded effort with the State of Utah Parks and Recreation and/or

the Utah Department of Transportation. The Forest Planning process highlighted the need for improved coordination and increases in the availability of plowed areas to provide for separation between motorized and non-motorized uses in some areas. Depending on the site-specific details, this may require further environmental analysis. Decisions about this site-specific need are not appropriate within the Forest Plan process. Therefore road and access management effects in winter do not vary by alternative.

Effects on Recreation Management from Vegetation and Fuels Management

Effects may be short or long term depending on the activity and could include increased noise and smoke levels, conflicts with logging trucks and visitors using the same roads in summer or winter, displacement of wildlife affecting viewing opportunities, and area restrictions or closures during operations. Hunting opportunities may be impacted short term due to closures, but may benefit long term from successful habitat treatments.

Longer term effects relate mostly to changes to the natural setting due to vegetation removal and road construction. Vegetation removal could have impacts to the scenic integrity visitors expect. It also may increase motorized trespass where undergrowth is removed or temporary roads are constructed. These roads may also benefit recreation if opened to travel.

Management prescription areas that emphasize recreation (4.1-4.5) do not have planned timber harvests, however some harvest may be allowed in prescriptions 4.3 and 4.4 only in Alternatives 3, 4, and 5. Vegetation treatments are allowed in all alternatives except Alternative1, but would need to meet recreation and scenery management objectives. Harvests may occur in prescription categories 5.1, 5.2, and 3.2 where recreation is also allowed. Effects from these activities would be greatest in Alternative 5; less in 2; and least and similar in Alternatives 3, 4, 6, and 7.

Fuels management effects on recreation are similar to the preceding effects. Alternative 1 may have the greatest effect due to the lack of active fuels management. This may cause an increase in fire intensity and extent, creating a more visible and long lasting change to the setting. The degree of these effects is difficult to determine. Prescribed fire has some level of predictability for time, location, and intensity that may decrease the short-term impacts to visitors. Occurrences of wildland fires are not predictable under any alternative. These effects are also complicated by the fact that some visitors may accept impacts from wildland fire, but not prescribed fire.

Effects on Recreation From Livestock Grazing

Effects on recreation from livestock grazing generally include visual impacts (removal of vegetation tops and remaining stubble, trampled vegetation and streambanks, manure, fences and other range improvements), auditory impacts (sounds of domestic livestock, especially sheep), and olfactory impacts (smells of animals and animal wastes). These are more pronounced where recreation use in livestock allotments is focused on a less human influenced or “pristine” setting expectation, such as within the High Uintas Wilderness area. Decisions for livestock grazing made in Forest Planning generally will have little effect on recreation given that changes to livestock grazing management that would affect recreation are implemented through allotment

management planning and permit actions. There will be little difference in effects on recreation from grazing by alternative with the exception of Alternative 2. This is because while alternatives 1, 3, and 6 identify differing amounts of suitable range, they do not close the un-suitable areas because they are scattered throughout active allotments. In Alternative 2, 26,000 acres of contiguous watersheds are closed to livestock grazing so any existing impacts to recreation use in these watersheds would be eliminated.

Alternatives 1, 2, 6, and 7 close vacant allotments to varying degrees, but because livestock do not currently use these allotments, no effects would be noted for recreationists. Alternatives 1, 2, and 6 have potential for future reduced livestock/recreation conflicts since these alternatives allow for the closure of Gilbert Peak, Henry's Fork-Hessie Lake, and Red Castle allotments should permits be voluntarily waived without preference. Alternative 7 would allow for these, as well as the East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater allotments to be closed, again only if permits are waived without preference. Should these allotments be closed at some point in the future, there would be consequent reduction in recreation user - livestock interactions in the Uinta Mountains and High Uintas Wilderness area.

Effects on Recreation from Inventoried Roadless Area Management

Currently large portions of Roadless Areas provide recreation opportunities in undeveloped areas where the setting is largely unmodified (i.e., semi-primitive). The exception to this is where roads are cherry-stemmed into these areas (see Appendix C-2). The majority of roadless acres provide recreation opportunities with relatively high levels of solitude and self-reliance, and less opportunities with visitor comforts, feelings of security, and social interaction. Access may be limited to trails in Roadless Areas and this limitation increases the sense of remoteness and decreases the opportunities for social interactions. Recreation developments are generally limited and most visitor management is at trailheads. The physical setting is best described as naturally evolving. There are little or no recognizable impacts from past timber harvest and vegetation treatments**.**

Summer Recreation

Where Roadless Areas are mapped with prescription 1.5, Recommended Wilderness, the ROS Class is Semi-Primitive Non-Motorized (SPNM). These areas would not allow either motorized or mechanized travel in summer. The amount of currently open motorized roads and trails that would be closed to motorized and mechanized (mountain bikes) uses varies by alternative. Alternative 1 is the only alternative that would require road closure with 1.9 miles in the Lakes Roadless Area and 0.4 miles in the Stansbury Mountains for a total of 2.3 miles. Table REC-13a displays by alternative the miles of motorized trails in Roadless Areas that would be closed to motorized and mechanized uses.

Table REC-13a. Motorized Trails within Recommended Wilderness that would be closed to motorized and mechanized use by Alternative

Motorized Trails Closed by Recommended Wilderness (Miles by Alternative)							
Roadless Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
High Uintas	15.2[1]	0	0	0	0	0	0
Lakes	11.1[2]	4.5[6]	0	0	0	0	0

Motorized Trails Closed by Recommended Wilderness (Miles by Alternative)							
Roadless Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Stansbury Mtns.	24.9[3]	0	0	0	0	0	0
Twin Peaks	2.7[4]	2.7[4]	0	0	0	0	0
Lewis Peak	16.5[5]	0	0	0	0	0	0
Willard	6.0[5]	0	0	0	0	0	0
Total	76.4	7.2	0	0	0	0	0

[1] Broadhead, Deadhorse ATV, Little Deer Creek, Lost Lake, Slate Gorge, Trail Creek, Wolverine ATV
[2] Box Canyon, Hoyts, Silks Basin, Slader Basin, Swifts Canyon ATV, White Pine Creek Trail
[3] Abbots Fork, Stansbury Front, Davenport Canyon, East Hickman Canyon, Martin Fork and West Canyon
[4] Mineral Fork Trail
[5] Wasatch Crest Trail
[6] Box Canyon, Hoyts, White Pine Creek Trail

There is an increasing demand for motorized recreation including camping and trail use. Closure of trails to motorized use in Alternatives 1 and 2 would result in displacement of those motorized trail users and especially in Alternative 1 could result in increased densities of motorized users on the remaining open trail system.

Wilderness or Recommended Wilderness would affect mountain bike use in several alternatives. Table REC-13b for mountain bike trail mileage is an estimate. Some trails are open to mountain bikes such as in the Upper South Fork roadless area (because all Ogden Ranger District trails allow mountain bikes), but receive relatively low mountain bike use. Therefore the actual effect on users would be less than the total stated miles.

Table REC-13b. System Trail Mileage Allowing Mountain Bike Use Affected by Recommended Wilderness

Trails Closed to Mountain Biking from Prescription 1.5							
Roadless Area	**1**	**2**	**3**	**4**	**5**	**6**	***7***
Burch Creek	6.5	NA	NA	NA	NA	NA	*NA*
High Uintas	12.6	7.8	7.8	NA	NA	5.9	*5.9*
Lakes	40.3	24.6	0	NA	NA	9.5	*9.5*
Lone Peak	0	0	NA	NA	NA	NA	*NA*
Mount Aire	11.3	NA	NA	NA	NA	NA	*NA*
Mount Naomi	33.5	15.5	3.8	NA	NA	3.8	*NA*
Mount Olympus	8.8	0	0	NA	NA	NA	*NA*
Nobletts	0.5	NA	NA	NA	NA	NA	*NA*
Stansbury	13.9	0	0	NA	NA	NA	*NA*
Twin Peaks	6.4	0	0	NA	NA	NA	*NA*
Upper South Fork	27.5	NA	0	NA	NA	27.5	*27.5*
Wellsville Mountains	0	0	0	NA	NA	0	*NA*
White Pine	5.3	5.3	NA	NA	NA	NA	*NA*
Widdop Mountain	0	NA	NA	NA	NA	NA	*NA*
Total	166.6	53.2	11.6	0	0	46.7	*42.9*

Mountain bike use is not allowed in Wilderness or Recommended Wilderness. Therefore Recommended Wilderness that includes trails currently open to mechanized equipment would require closure of those miles to that use. Alternative 1 has the most (167 miles) followed by Alternatives 2, 6, 7 and 3. Alternatives 4 and 5 have no Recommended Wilderness and would not effect mountain biking.

Winter Recreation

Where Roadless Areas are mapped with prescription 1.5, Recommended Wilderness, the Winter Recreation opportunity is non-motorized with one exception. In Alternative 7, winter motorized use is allowed on currently open areas within prescription 1.5 located within the Lakes and High Uintas roadless areas. In Alternatives 1 and 2, which have the most acreage of Recommended Wilderness, snowmobiling use within recommended Wilderness 1.5 MPC is prohibited and would displace current users and increase winter-motorized use in other areas. Alternative 1 also prohibits snowmobiling in other roadless areas (not recommended for wilderness) and Alternative 2 limits snowmobiling to cherrystemmed roads within roadless areas. These alternatives offer the most non-motorized winter opportunity in roadless areas. Alternatives 4 and 5 have no Recommended Wilderness and do not affect snowmobiling in those areas. Table REC-12 displays acres of winter recreation opportunities by alternative.

Wilderness additions in the Tri-Canyon area in Alternatives 1 and 2 would *eliminate* heli-skiing opportunities. Alternative 3 would eliminate the Gobbler's Knob area from heli-skiing because of Wilderness recommendation there, but would substitute an area in Big Cottonwood Canyon for this acreage, allowing heli-skiing to continue in the Tri-Canyon area.

Effects on Recreation from Soil and Water Resources and Aquatic and Semi-Aquatic Species

Soil and Water Resources, Aquatic and Semi-Aquatic Species Management can directly affect recreation opportunities and quality of experience. These may include fish and watershed management actions that restrict access, development and selected activities. Management prescription categories with an aquatic and semi-aquatic species as their focus include 3.1, 3.1a, and 3.1w. Alternatives 7, 6 and 2 provide the highest amount of acres in aquatic and watershed emphasis area (MPC 3.1, or 3.1a and 3.1w) and Alternative 5 has the lowest amount of acres. Levels of recreation development would still remain low and would be proposed to meet management objectives related to watershed and aquatic habitat protection or improvements. Alternative 1 has the potential for the greatest impacts to recreation, because Alternative 1 emphasizes natural processes with minimal human intervention. This may result in either eliminating or reducing human activity where impacts on watershed and aquatic habitat are occurring. Because a high percentage of developed and undeveloped sites are located within floodplains of most drainages this may result in a number of these facilities being closed and removed from operation. This would reduce the recreational opportunities on the Forest and limit the campsites accessible to the public. Visitors are drawn to water and impact riparian vegetation and aquatic habitat and in some cases this causes a loss of watershed function. Impacts to riparian areas and aquatic resources are a particular concern.

An example of the effect is shown by campsite surveys on the Logan Ranger District where over 50 percent of the identified undeveloped recreation camps as well as some trails would be closed. This would be consistent throughout the entire forest because of difficulty in managing people who want to recreate adjacent to water and shade, resulting in impacts to water resources. Alternative would require a very active law enforcement program. All of the other alternatives rely on an array of active management tools and not closures to general forest areas as the primary means to resolve impact to Soil and Water Resources, Aquatic and Semi-Aquatic Species Management from recreation activities.

In Alternative 7 new developed recreation sites will be affect in MPC 3.1a and 3.1w. For 3.1a and 3.1w, new recreation development is not allowed. Though the locations for a majority of the WCNF existing sites are located in 3.1a and 3.1w areas, new sites would need to be built in other MPC areas that allow construction. This may cause these upland sites to be used less as people generally seek sites next to water where water recreational activities can take place. These upland sites would probably be less expensive to develop and maintain with less concern for flooding and riparian damage.

Effects on Recreation from Wildlife Management

Except for site-specific effects not addressed in this Plan revision such as seasonal road closures in cooperation with State wildlife managers, wildlife management has little effect on recreation in summer. In winter however, needs for protecting critical big game winter ranges from disturbance by motorized uses can directly affect winter recreation opportunities. Closures to winter motorized uses on big game winter ranges vary by Alternative. In some cases the closed areas are steep, south facing with limited snow cover and may not be ideal for snowmobiling. However in other cases, especially with elk winter range which tends to extend higher in elevation than deer, these areas are desirable for snowmobiling. Table Rec-14 shows by alternative, how winter recreation is managed in big game winter ranges and the percent of total non-motorized area closed specifically for big game winter range reasons.

Table Rec-14 Winter Recreation in Big Game Winter Range

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	EC
Total Non-Motorized Acreage	988,000	938,800	571,900	470,900	541,600	686,800	694,800	600,700
Non-Motorized Acreage within Winter Range	222,800	222,100	136,700	88,300	129,500	166,700	190,700	149,100
Motorized Acreage within Winter Range	22,400	22,600	108,600	141,700	115,700	78,600	54,500	96,100
% of Total Closure for Winter Range	23%	24%	24%	19%	24%	24%	27%	25%

Compared to the existing condition, Alternatives 1 and 2 would have the greatest effect on winter motorized recreation in conjunction with closures for big game winter range. The proportion of these areas actually desirable for snowmobiling is not known. However, the closures for winter range are relatively small compared to closures for other reasons such as wilderness recommendation and roadless area maintenance that would result in higher user densities in the remaining open areas with increased crowding, conflicts and safety concerns. Alternative 6 or 7 would have the next greatest effect but since the total area closed is significantly less than Alternatives 1 and 2, increased user densities would not be expected to be as significant. Alternative 7 designates several "through routes" for snowmobiliers to move through big game winter range to higher areas desirable for that use. Alternatives 3 and 5 close less areas to motorized use in big game winter range than other Alternatives except 4. Given the relatively large amounts of area open to this use noticeable increases in user densities specifically because of closures for big game winter range would not be expected in these Alternatives.

For non-motorized winter recreation opportunities closures to motorized use within big game winter range would create more areas with separation of use with directly proportional to the acreages shown as non-motorized in Table REC-14. However, the areas vary in their desirability for winter recreation activities for the same reasons described above- steep often south facing slopes with variable snow conditions.

Effects on Recreation from Threatened, Endangered and Sensitive Species Management

Effects to recreation would be consistent in all alternatives due to the Endangered Species Act, Forest Service direction, and policy which require listed and sensitive species be protected. Impacts from management of these species may include seasonal road restrictions to total closures, vegetation manipulations to improve habitat, or structural improvements. Recreation activities likely to be affected can include: closure of rock climbing areas to protect sensitive plants, removing camping where it impacts Bonneville or Colorado River cutthroat trout, cave closures to protect cave resources, and allowing no net increase of groomed trails or snow packing from winter recreation activities to protect lynx habitat. Such impacts could significantly increase if species currently not listed or listed as Forest Service Sensitive were elevated to Fish and Wildlife Service Threatened or Endangered classifications.

Effects on Recreation from Special Management Areas

These areas are managed to maintain the setting characteristics for which they were established. They are represented by MPC 2.4 through 2.7. Acres within this category decrease opportunities for new recreation developments and access while increasing opportunities for self-reliance, viewing scenery, and educational opportunities. ROS opportunities will range from the Semi-Primitive Non-Motorized category to Rural settings. Motorized use will be restricted to existing routes. High levels of visitor management may be required to protect the resource of concern and interpret the resource values. Alternative 1 provides the most acres in these categories. About half as many acres are in Alternative 2 as Alternative 1. Similarly there are about half as many acres in Alternative 6 as in 2. Alternative 3 has slightly fewer acres than Alternative 6, while Alternative 5 has about one third of the acres of Alternative 3.

Effects on Recreation from Oil and Gas Activities

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" as described in Topic 9 – Oil and Gas. It is estimated to be about 68,300 acres.

The degree to which oil and gas activities such as exploratory drilling, oil and gas field development and other activities involving the construction of roads, well sites and other facilities would affect forest visitors depends on the type of opportunity, experience and setting present. The impacts associated with the drilling of a single exploratory well could adversely affect the setting associated with the backcountry and non-motorized opportunities. These impacts would be of relatively limited area, short duration, and once drilling and reclamation is completed the impacts would not be significant. However, some evidence of human activities would be present for a long period. These impacts may be of relatively high intensity and long duration if they are associated with oil and gas field development and the subsequent production of oil and gas. The impacts associated with a producing oil and gas field could last 20-30 years.

For recreation opportunities and settings associated with roads and vehicular use, the impacts will likely be less significant. In many cases oil and gas activities can be shielded from areas popular for recreation use so development is less evident to visitors. New or improved roads constructed for oil and gas activities could enhance motorized recreation activities, if after site-specific analysis they remain in place and open. In the case of a non-productive exploratory well, the road and well pad may be decommissioned and reclaimed or the road could be managed as open for new access. A producing oil and gas field would have a system of well-developed roads such as those present in the oil fields on the Mountain View Ranger District. In that case, visitors would experience some oil and gas-related traffic. In all of the alternatives but Alternative 4, the majority of the Appeal Settlement Zone is mapped as semi primitive non motorized for summer recreation opportunities. Site-specific analysis would be required to determine the future disposition of roads, unless already specified by management prescription

Short-term noises of drilling and the potential long-term noise from pumping and odors of gas production could negatively affect users near an oil production site.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alt 4) an area of existing leases, the Table Top Unit, could be explored and result in effects to recreation opportunities and settings. The degree to which the Table Top Unit is explored is affected by whether or not new leases could be issued and under what stipulations.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect the primitive recreation experience. The primitive recreation setting could be affected on an estimated 20 acres because of oil and gas exploration activities. Once existing leases expire, the area would be unavailable for leasing since the majority of this area would be recommended as Wilderness. Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could affect the undeveloped recreation setting on about 20 acres. Once existing leases expire, leasing

availability in areas recommended for Wilderness is precluded. On remaining available acres, new leases could be issued, but surface occupancy would not be allowed. No surface occupancy would maintain the undeveloped recreation setting.

Alternative 3 precludes leasing availability in areas recommended for Wilderness in the future and does not allow new leases with surface occupancy in areas managed for undeveloped and backcountry recreation values. The semi-primitive nonmotorized setting would be maintained within the majority of the area. Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,400 acres are available under Standard Lease Terms. Oil and gas activities are estimated to disturb about 75 acres. Some of the effects to recreation opportunities could last 20-30 years because of field development. Some development is predicted within the Table Top Unit. If the development occurs within semi-primitive nonmotorized settings, these areas could be significantly affected.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to the recreation setting are expected.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to disturb about 105 acres. In areas managed as semi-primitive or for backcountry recreation values such as sights and silence associated with solitude would be significantly affected. Motorized recreation could benefit from additional access, if new roads are managed as open. Some of the effects to recreation opportunities could last 20-30 years because of field development.

In Alternative 6 new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized undeveloped recreation values and terrestrial habitat. Within this area because of the Controlled Surface Use stipulation applied to areas with high or moderate scenic integrity level, activities would be shielded to visitors, which would lessen the effects to recreation. In the remainder of the area the effects to recreation would be minimal because of no surface occupancy.

Alternative 7 would preclude leasing on 20,400 acres recommended for Wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb about 85 acres. Some of the effects to recreation opportunities could last 20-30 years because of field development. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Most critical to the recreational experience are those acres managed for a backcountry or non-motorized experience (Management Prescriptions 4.1 and 4.2). The majority of area managed for these values is protected by a no surface occupancy stipulation. On the remaining portion oil and gas leasing would be allowed with a controlled surface use stipulation that would be strictly applied to locate or shield oil and gas activities from visitors. Temporary road construction

would be allowed for operator's access and for the life of the well. Though only administrative use would be allowed, new roads may temporarily affect the recreation experience of non-motorized users. Restoration activities would return to area to a non motorized setting.

Environmental Consequences for Ski Areas

Effects on ski areas from Roadless Areas management

Alternative 1 recommends considerable additional Wilderness or non-motorized roadless prescriptions adjacent to or near all ski areas. Future expansion would not be possible for ski areas if Wilderness protections were put in place in adjacent areas. In Alternative 2 additional Wilderness is recommended in White Pine limiting future expansion for Snowbird. Roadless prescriptions near Brighton, Alta, Solitude, and Snowbasin would not allow new road construction and would limit motorized access to only administrative use for ski areas' maintenance or internal development. In Alternatives 3, 4, 6 and 7 Roadless Areas adjacent to all ski areas are protected for watershed, wildlife, or backcountry non-motorized recreation purposes, which would limit motorized access into the ski areas for work.

Effects on ski areas from fire/vegetation management

Wildland fire use is not allowed in ski areas in any alternative. While prescribed fire could be allowed, high property value and potential control issues make it unlikely that this method for treating vegetation would be selected. Mechanical treatments would be preferred to reach desired scenery or vegetation objectives.

In areas adjacent to ski areas vegetation management through the use of prescribed fire is potentially applicable for all alternatives, although mechanical treatment would be more likely. Wildland fire use adjacent to a ski area is allowable, though unlikely. Any threats to high property value would be mitigated rather than suppressed. While Alternative 1 stresses reliance on natural processes for meeting vegetation management and most ecosystem needs, if fire starts were near a ski area, they would be carefully monitored, and threats to life and property would be suppressed.

Effects on ski areas from scenery management

Within ski area permit boundaries, the ski area will be consistently managed in a Resort Natural Setting Landscape Character Theme (LCT) and a High Scenic Integrity Objective (SIO) for Alternatives 1-3 and 5-7. Under Resort Natural Setting LCT the management of the landscape will change from current management, which is defined as acceptable degrees of deviation from a natural landscape to management for positive human alterations to the landscape. To maintain a High SIO structures would be thematic in context within the resort boundaries and harmonize with the form, line, color and texture of the natural setting. Vegetation and landscape islands would be incorporated into future parking designs and reconfigurations to minimize the expanse of the parking lots.

Alternative 4/1985 will manage the landscape in a "Natural" LCT using degrees of acceptable change. Management of the base of the ski would be in a Low SIO and the slopes of the permit would be managed as Moderate SIO which would continue scenery management as it is currently, except with a change in terminology. See Appendix D-4 allocation framework Scenery Management System for more details for LCT and SIO descriptions. Alternative 5 expands the LCT of Resort Natural Appearing to match the proposed permit area expansion. Even though the LCT of adjacent landscapes to the ski areas change by alternative, there would be no effect to scenery because of the sensitivity of watershed.

Effects on ski areas from wildlife and fisheries management

No difference across the alternatives in the effect to ski areas from fish and wildlife management. Ski areas would need to meet the intent of conservation agreements, in-stream flows, and other standards, guidelines, and laws that provide protection for fish and wildlife species and to mitigate effects of any project proposal. Costs for future development at ski areas would be an effect to the ski areas.

Effects of ski areas from watershed and soil management

Any development or modification proposal for ski areas would need to meet soil and watershed conservation practices, within existing boundaries as in Alternatives 1, 2, 3, 4, and 6, or with expanded boundaries as in Alternative 5. Mitigation of effects to soil and watershed would need to be applied, which will incur costs to the ski areas for implementation of projects.

Cumulative Effects

The method of analysis is to described the cumulative effect issues, describe the cumulative effect area and the time frame for analysis, identify past, present and reasonably foreseeable actions.

Issues
The main issue identified under recreation involves increasing conflicts between and among users of motorized/mechanized vehicles (ATV's, snowmobiles, helicopters for skiing, ski area permit expansion to adjacent areas, and mountain bikes) and non-motorized recreation.

Cumulative Effects Area and Time Frame
The cumulative effect area in within approximately 2 hours of the main population centers of Salt Lake City, Ogden, Logan, Tooele and Park City that provides the majority of the recreation users on the Forest. The time frame is from the previous planning period through the next planning period or approximately 10 to 15 years before and after the present time.

Past, Present and Reasonably Foreseeable Actions
The environmental consequence section describes effects to recreation from various topic areas. Of these topic areas, the primary topics that could cumulatively affect recreation management are from other recreation uses; Roads and Access; Vegetation and Fuels Management; Livestock Grazing; Inventoried Roadless Areas; Soil, Water, Aquatic, and Semi-Aquatic Species; Wildlife

Management; Threatened and Endangered Species; Special Management Areas; and Oil and Gas Activities.

Cumulative Effects from Recreation on the National Forest

Population Growth along the Wasatch Front has increased dramatically during the last two decades. The Greater Wasatch Area (GWA) Stretches from Nephi to Brigham City and from Kamas to Grantsville. The GWA is currently home to 1.7 million residents, which make up 80 percent of the State's population, making Utah the sixth most urbanized state in the nation. The population of Utah is expected to increase to 3.3 million in 2020 with 2.5 million living in Davis, Salt Lake, Utah, and Weber Counties. The youth population will continue to be the largest age group in the state (Utah, State of. 2002b). The cumulative effect of increased population is high demand for outdoor recreation opportunities provided in an alpine setting, which the WCNF provides for with easy access from major population centers. This growth has pushed urban development closer and closer and in many cases directly adjacent to public land boundaries. These public lands provide the growing population a place to go to recreate and enjoy a relative pristine mountain setting. This population growth, coupled with new technologies, is having a profound effect on the surrounding Public Lands. As the population increases, the niche that the WCNF provides in the recreation opportunity spectrum is being increasingly burdened.

Increased use has required the Forest Service to reconstruct and harden a significant number of picnic and campsites in addition to making them all more accessible to all members of the public. These modifications in additions to many other factors have helped to change the desired experience for many recreationists. Other public agencies and local communities including private individuals have developed campgrounds, parks, picnic sites and recreation facilities, but these are typically at lower elevations and primarily see use during the spring and fall. These facilities meet many people's recreation needs but do not always fill the desired alpine recreation experience. As temperatures increase during the summer, most of these people flock to the Forests for the alpine experience and the subsequent relief from the heat.

Technology is continually making improvements to All Terrain Vehicles (ATV), Snowmobiles and Mountain Bikes, which changes the mechanism and its ability to traverse National Forest System Lands. In 2000, the number of off-highway motorcycles, ATV's, snowmobiles and recreational 4X4s in Utah is estimated at almost 163,000 (Fisher et al. 2001). Technology is continually making improvements to ATV, snowmobiles and mountain bikes. ATV's are more powerful, have better suspensions and have better traction than they have ever had before. The cumulative effect of the increase in technology is that snowmobiles have been improved to the point where there is almost no areas on the Forest where they cannot travel in the deepest snow conditions. ATVs allow a wide range of users a comfortable and affordable mode of transportation that can traverse rugged roads, trails and open areas of the forest with a minimal skill level. This has created a trend toward increased numbers of user created trails and ATV operation on roads with mixed traffic. With lighter frames, better gearing and suspensions, mountain bikers are continually pushing the limits of what and where people can ride. In addition, new types of technology like land toboggans, mountain skateboards etc. continue to change how the forests is used.

There has been a dramatic increase in the use of these technology driven recreational pastimes. The number of snowmobiles and ATV's registered in Utah has climbed from about 26,000 in 1980 (Thompson, H. 2001) to about 116,000 in 2002 (State of Utah Tax Commission). The sale of Mountain Bikes has increased dramatically during the last 10 years. Mountain Bikers have created a number of conflicts between riders and hikers as each compete for the same trail. Similar conflicts exist between motorized and non-motorized users both during summer and winter as they recreate in similar areas and trails. The popularity of these sports has increased dramatically in the past ten years and is projected to continue to increase at a similar rate. The cumulative effect of the increase numbers of motorized recreation vehicles is the desire to have more opportunities for discovery and testing of skills on limited travel ways and land mass, which push user densities towards undesirable levels for many recreationists and have the potential to cause more user conflicts.

In addition to an increase in mechanical forms of recreation, as the population grows there will likely be additional increases in more traditional forms of recreation such as hiking, climbing in the summer and cross country skiing, ski touring and snow shoeing in the winter.

Other recreation providers in Northern Utah public land are National Forests adjacent to the WCNF such as the Caribou National Forest to the north, the Ashley National Forest to the east, and the Uinta National Forest to the south. Bureau of Land Management lands are located to the east from south of Bear Lake to Woodruff. Wildlife management areas near the WCNF include; Salt Creek Waterfowl Management Area, Bear River Migratory Bird Refuge, Harold S. Crane Waterfowl Management Area, and the Ogden Bay Waterfowl Management Area. These areas provide developed and undeveloped recreation opportunities similar to those available on the WCNF. As recreation use continues to grow, some visitors may be displaced to other locations. Conflict between users may also escalate, increasing the need for management actions to manage the conflict. While other opportunities are available, they generally do not include the high elevation or large areas needed for some activities, particularly snowmobiling and backcountry skiing. Conflict between these users is currently high and is expected to increase.

Beaver Mountain Ski Area, Powder Mountain Ski Area, The Canyons, Park City, Deer Valley, and Sundance Ski Resort are in constant competition with the five ski areas on WCNF in order to keep their part of the market. Total skier visits in Utah are forecasted to grow from around 3 million currently, to over 4 million by 2007. (USDA Forest Service. 1999d). "Approximately 49 percent of (3.1 million) Utah ski resort visitors were non-residents from other U.S. states. Roughly 3 percent were international visitors while the remaining 48 percent of resort visitors were residents of Utah." (Wikstrom Economic and Planning Consultants. 2000) With this trend a change in the market could have cumulative effect on the five ski areas on Forest Service System lands administered by the WCNF either for the positive or negative.

Inventoried Roadless Areas may displace users from Uinta, Caribou, and Ashley NF and cause increase use on the WCNF.

The marketing of tourism in the State of Utah, Idaho and Wyoming inform people of areas where they can recreate. With the invention of better electronic communications, marketing is less and less controlled and provides information to the user that may be incomplete. It is much like the

gold rush of the 1800's where people sought riches of the west based on tale's that you could pick the gold off the ground as you walked along. This may have been true for a few people, but when you put thousands of people in the same place the chances of finding gold became mute. Thus it is with information technology tourism marketing when a company of web sites tells people of the wonderful recreation experience they can have by going to this location of the Forest. The land becomes overburden and can no longer provide the experience described and causes conflicts of desires and with other users.

Rapid urban expansion is expected in the next 20 years and as open space diminishes pressure to build on the foothills will increase (Utah, State of. 2002b). Private land development is occurring adjacent to the WCNF boundary with high density housing along the foothills and in some more mountainous areas such as canyons east of Salt Lake City from Emigration Canyon to Little Cottonwood, upper Weber drainage, Woodland, north side of the South Fork Ogden River, Little Bear drainage, west of Bear Lake, near Bear River Service, and Meeks Cabin Reservoir. This continued expansion necessitates communities planning for the future by identifying access points and trails systems that will provide recreation opportunities for the nearby residents. Because National Forest System lands are or will be the boundary for this development, the cumulative effect will be ever increasing recreation pressure on these adjacent lands.

When vegetation and/or fuels management occurs on adjacent public lands the recreation users are displaced to another location that provide an alpine recreation experience. This could happen because of specific management activities, human caused events or acts of God all of which have a cascading effect of moving recreationists from one location to another and creating undesirable conflicts as user density increases and users find that their personal special Forest location has been taken over by another individual.

Topic 4 – Recreation/Scenery Management

Scenery Management

Introduction

The scenery visible to people visiting or living by the WCNF constitutes the scenic resource. Scenery is described as the general appearance of a place or landscape, or the features of a landscape. The character of the landscape varies by location and is dependent on natural features such as geology, vegetation, water features, landforms, natural disturbances and human alterations

The WCNF is the scenic backdrop and playground to the populace of the Wasatch Front, Cache Valley and other basin communities in Utah and Wyoming. People view these scenic resources from their residences, special places and travel ways that meander through the Forest.

> *"The majority of the recreation-oriented people who visit the National Forests have an image of what they expect to see. Such an image or mental picture is generated by available information concerning a particular area and the person's experience with that or similar areas. The image produced represents the knowledgability, expectedness, romanticism, and emotionalism associated with features within an area. Obviously, several images may exist simultaneously, even within a single individual, and yet a particular geographic region tends to have an identifiable image."* (AH 701. 1995)

The WCNF scenic image has been recognized nationally for its landscapes seen from its Scenic Byways, travel ways, Wilderness backcountry, recreation facilities, overlooks and canyon resorts. Viewing Scenery is one of the highest recreation activities in the nation and on the Forest.

Background

Forest management activities have the potential for directly, indirectly and cumulatively affecting the scenic resources through vegetation management, facility construction, road building, fire, and any other human interactions with the forest. These activities are related to many of the Need for Change topics, and could be implemented under any of the alternatives. Therefore, potential effects on the scenic resource are analyzed in this section.

Laws, Policy and Direction

Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528 (note)). This Act authorizes and directs the Secretary of Agriculture "to develop and administer the renewable surface resources of the National Forests" with "harmonious and coordinated management of the various resources ... with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output."

Wilderness Act of 1964 (16 U.S.C. 1131). This Act directs the United States to retain the "primeval character and influence" of Wilderness areas and to protect and manage a Wilderness area "so as to preserve its natural conditions which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable." One of the six primary public purposes of a Wilderness area is scenery.

National Trails System Act of 1968 (16 U.S.C. 1241). This Act authorizes the Secretary of Agriculture to administer and manage national scenic trails "for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass."

Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271). This Act directs the United States, in its administration of components of the national wild and scenic rivers system, to give primary emphasis to protecting "its aesthetic, [and] scenic . . . features."

National Environmental Policy Act of 1969 (42 U.S.C. 4321). This Act directs the Federal Government to "(2) assure for all Americans . . . healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, [or] risk to health; (4) preserve important historic, cultural, and natural aspects" of our environment. It further directs agencies to "insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment." This Act directs agencies to develop methods and procedures "which will insure that [scenery and other] unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations."

Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1601). This Act directs the Secretary of Agriculture to prepare land management plans, which provide for outdoor recreation and to develop and keep current a comprehensive inventory of all National Forest System, as well as state and private, lands and resources. This Act requires an assessment of potential aesthetic impacts during the interdisciplinary review of proposed timber sale areas, which would include clear cutting and other cuts designed to regenerate an even-aged stand of timber. It also specifies treatment of other cut blocks and protection of aesthetic resources. It directs that multiple use and sustainable yield guidelines be used with private lands involved with government programs.

The Visual Management System 1974. This publication is U.S. Forest Service Agriculture Handbook No, 462. It provided direction under which landscape management for the 1985 Forest Plan was developed. This direction was widely implemented during the "first round" of forest plans from the 1980's and 1990's.

Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 (note)). This Act states that it is the policy of the United States to manage public lands in a manner that will protect the quality of scenic, ecological, and environmental values. It further directs the Secretary of the Interior to prepare, maintain and keep current an inventory of "outdoor recreation and scenic values" on all public lands. This authority is delegated to the Secretary of Agriculture to allow Forest Service management of some Bureau of Land Management lands.

National Forest Management Act of 1976 (16 U.S.C. 1600 (note)). This Act requires that the removal of trees, portions of trees, or forest products "be compatible with multiple use resource management objectives in the affected area."

Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201). This Act authorizes the Secretary of Agriculture to permit surface coal mining operations if there are no significant recreational or other values, which may be incompatible.

Public Rangelands Improvement Act (1978) declares "unsatisfactory conditions on public rangelands reduce the value of such lands for recreational and aesthetic purposes."

RPA Statement of Policy Act of December 12, 1980 (P.L. 96-514, 96 Stat. 2957). This Act states that it is the policy of the United States that the "Nation's forested land, except such public land that is determined by law or policy to be maintained in its existing or natural state, should be managed at levels that realize its capabilities to satisfy the Nation's need for . . . recreation and aesthetic values."

North American Wetlands Conservation Act of 1989 (16 U.S.C. 4401(note), 4401-4413, 16 U.S.C. 669b (note)). This Act recognizes the aesthetic values of fish, shellfish, and other wildlife; it further recognizes that wetland ecosystems provide aquatic areas, which are important for recreational and aesthetic purposes. It directs the head of each Federal agency, to the extent consistent with their mission and statutory authorities, to cooperate to restore, protect, and enhance the wetland ecosystems and other habitats for migratory birds, fish, and wildlife.

Tourism Policy and Export Promotion Act of 1992 (P.L. 102-372, 106 Stat. 1170; 22 U.S.C. 2121 note, 22 U.S.C. 2124c). This Act created the Rural Tourism Development Foundation to assist in growth and "promotion of rural tourism [to] contribute to the economic development of rural America and further the conservation and promotion of natural, scenic, . . . and recreational resources…."

Scenic Byways (Intermodal Surface Transportation Efficiency Act of 1991) (23 U.S.C. 101(note)). This Act directs establishment of a national scenic byway program with designation criteria to include consideration of scenic beauty. It further recommends that designated travel ways have operation and maintenance standards which include "strategies for . . . protecting and enhancing the landscape and view corridors surrounding such a highway."

Landscape Aesthetics Handbook, Agriculture Handbook, No. 701, 1995 This handbook replaced The Visual Management System, Agriculture Handbook No. 462. The Scenery Management System (SMS) presents a vocabulary for managing scenery and a systematic approach for determining the relative value and importance of scenery on National Forest lands.

Affected Environment

The affected areas for direct and indirect effects to scenic resources are the lands administered by the National Forest. These areas represent the National Forest System lands where the scenic resources exist, and the lands where those resources could receive both management activities

and disturbance events. The affected area for cumulative effects includes the lands administered by the National Forest, and the lands of other ownership both within and adjacent to the National Forest boundaries. Cumulative effects to resources on the other land ownerships are addressed to lend a broader perspective to the importance of scenic resources on the Forest and to acknowledge the inter-relationship with those lands.

The present landscape is a result of the interactions of existing vegetation and landforms on line, form, color, and texture of the viewed scenery. The existing landscape character varies by location and are dependent on such influences as geology, water, vegetation, landforms, and human developments and activities. The scenic landscape is a dynamic medium and is continuously modified by both human and natural causes.

Geologic events, wildland fire, human developments and activities and wildland fire exclusion have altered much of the landscape that comprises the WCNF. Some of these altered landscapes are not obvious to casual viewers because they still present a natural appearance, or cultural modifications appear to be part of the *valued* image people are expecting in a landscape. This is especially true when looking at some of the vegetation conditions that have resulted from fire exclusion.

For planning purposes, the Forest is divided into five Landscape Character Types (LCT), which have varying degrees of human alteration. They range from the subtle changes found in Natural Evolving LCT (25 percent of the Forest) to the highly modified Landscape Character Theme of Water Recreation Rural Appearing (0.3 percent of the Forest) found in Ogden Valley's, Pineview Reservoir, located in a rural culture setting of farms, tree lined fields and patch work of fenced pastures. A majority of the Forest's LCT is Natural Appearing (72 percent) where the altered landscape appears natural to the casual visitor where valued amenities such as trailheads, campgrounds and historic uses are evident.

Adjacent to the scenic byways on the Forest are landscapes that have moderate to high densities of developed forest facilities in a natural setting and is described as Developed Natural Appearing (2 percent). Five ski areas comprise the remainder of the Forest where mountain villages, base facilities, ski runs and trails mimic or abstract characteristics of color and forms found in the surrounding landscape and is described as Resort Natural Appearing (0.5 percent) (See Appendix D-4 Allocation Framework Scenery Management System for more detail description of Landscape Character Themes).

For the Wasatch-Cache providing pleasing landscapes with appropriate protection for supporting resource elements has always been a major consideration in larger allocation decisions and at the project level. A new program for scenery management is proposed in this FEIS.

Visual Management System, Visual Quality Objectives (VQO), and the proposed Scenery Management System (SMS)

The biggest difference proposed for scenery management is the new Forest Service program management direction for scenery. Existing Forest Plan direction for scenery was created under the Visual Management System (Forest Service Handbook, No. 462, April 1974), which

developed Visual Quality Objectives (VQOs) for the forest. The base line that VQOs are compared against is the perceived natural landscape; any deviation from this base line would be considered negative and an effect on the landscape character. Proposed Forest Plan direction, under any alternative except the No-Action Alternative 4/1985, is formulated under the new direction found in Landscape Aesthetics, A Handbook for Scenery Management, (USDA Forest Service. 1995b).

In the early 1990's the Forest Service determined that a new landscape management methodology was desirable. The new system has basic differences from the old system, although it still incorporates some of the original inventory element of the old version. SMS has a new vocabulary of terms, encourages public participation in development of desired future conditions, and does not necessarily judge human developments (buildings, roads, structures) or natural disturbances as detraction from a landscape's character.

In a general sense, over half of the Forest is now being managed as "Moderate to Low" Scenic Integrity Objective if we translate the existing VQO system into SMS terms. Because cultural features are considered negative, providing direction to move to a higher Scenic Integrity Objective is difficult and likely will not occur. Vegetation will continue to be managed to appear as natural as possible within the application of the existing plan's management practices.

Complete general description of SMS methods are provided in (USDA Forest Service. 1995b.) Appendices to this FEIS are provided to show specifics about how SMS has been interpreted for application on the WCNF. Appendix D on Scenic Resources presents SMS as one of three basic allocation mapping frameworks used in this planning process, the other two being Management Prescription Categories (MPC) and Recreation Opportunities Spectrum (ROS). Almost all SMS Landscape Character Themes (LCT) and Scenic Integrity Objectives (SIO) correlate directly to specific Management Prescription Categories, and as such vary by alternative as MPCs do for the same areas. Two minor exceptions (in terms of overall acreage on the Forest) are Resort Natural Settings LCT (essentially ski areas) and Water Recreation Rural Appearing LCT (Pineview Reservoir); these are distinct categories with an indirect MPC correlation. The direction in Appendix B that is particular to this forest includes: a Conversion Table of Management Prescription Categories to Landscape Character Themes and Scenic Integrity Objectives; and a Definition Table for Landscape Character Theme and Scenic Integrity Objective. In addition to the general Glossary in the FEIS, the Scenic Resources section of Appendix B also includes a glossary of terms specific to SMS.

Environmental Consequences

General Effects

Scenery is an integral component of all national forest landscapes, and contributes to the quality of people's experience. Scenery has been altered in numerous locations across the Forest by both human and natural forces. Obvious significant effects on scenic resources arise from a variety of resource management activities and public uses such as recreation, timber management, wildland and prescribed fire, grazing, oil and gas leasing and development and utility corridors that alter vegetation and the landscape appearances. The relative amount of

these activities and uses vary by alternative. However, they are likely to be present to some extent in all alternatives.

In any given year or decade, only a small percentage of a forest is or may be treated (timber harvests, prescribed fire, construction, etc.). Prior to implementing any site-specific project, an analysis shall be completed which will disclose potential impacts and require specific mitigation measures to ensure compliance with adopted objectives for Scenery. The objectives are minimum guidelines to be met and it is understood that project implementation will always strive to minimize adverse effects to the scenic resources of the Forest.

Table SMS 1 shows how the acreage of the several Landscape Character Themes and Scenic Integrity Objectives varies by alternative when looked at across the WCNF. Note that management under Alternative 4 is depicted in terminology from the old VMS system, and no direct translation is possible between the two systems to compare current environment with the action alternatives.

For Alternatives 1-3 and 5-7 the Forest would be managed under five LCT's. For all Alternatives except Alternative 1 and 4, the management of the largest percentage of the Forest would be in a Natural Appearing LCT. In Alternative 1 over half of the Forest would be managed in a Natural Evolving LCT and Alternative 4 would manage the entire Forest in a Natural LCT. See Appendix D-4 for detailed descriptions of Landscape Character Types (LCT), Scenic Integrity Objectives (SIO) and see Conversion Table D4-1 for the correlation of MPC to LCTs and SIOs.

Natural Appearing LCT is divided into three Scenic Integrity Objectives (SIO: High, Moderate and Low. For the High SIO, Alternative 7 would have the greatest amount where nearly half of the LCT would be managed in a High SIO. Alternative 2 would have the next highest and Alternatives 3, 5 and 6 would be moderate while Alternative 1 would have the lowest at about one third of the LCT.

The MPC for Terrestrial Habitat, Forested Vegetation Multiple Resource Objectives, Communication Sites and Mineral Development emphasis would be managed in Moderate SIO within Alternatives 3 and 6 managing over a quarter of the LCT. About an eighth of LCT in Alternatives 2 and 7 would be Moderate and Alternative 1 would have the lowest amount of the Moderate SIO.

Low SIO would include MPC 5.2 Forest vegetation timber growth and yield, and also includes Utility Corridors, but the acres are not shown because only the transmission lines activities would be managed as a Low SIO all other activities would be managed as defined by SIOs for each alternative. There are no Forest vegetation timber growth and yield activities in Alternatives 1 and 2. Alternatives 3, 6 and 7 have less than 4 percent of the LCT managed as Low SIO and Alternative 5 would have 30 percent of the LCT in a Low SIO.

Natural Evolving would represent the scenery LCT for the Wilderness and Recommended Wilderness on the Forest in each Alternative except 4/1985. The SIO for this LCT would be Very High. In Alternative 1 the Very High SIO includes over half of the Forest. For

Alternatives 2, 3, 6 and 7 about a third of the Forest would be Very High and Alternative 5 would be about a quarter of the Forest.

Natural LCT makes up all of the Forest in Alternative 4 and is divided into four SIOs:, Very High, High, Moderate and Low. This represents the 1985 plan and was created by making a cross-walk in terms from VQOs to SIOs. See Appendix D for definitions. There is no correlation for these SIOs to the MPCs for Alternative 4/1985 Forest Plan.

Landscape Character Types (LCTs) such as:

- Developed Natural Appearing include Scenic Byways and Developed Recreation Areas along the byways.
- Resort Natural Setting includes Developed Recreation Areas such as Ski areas.
- Water Recreation Rural Appearing includes Pineview Reservoir.

These LCTs make up a very small percentage of the managed Scenery on the Forest for all alternatives except Alternative 4/1985. The specific activities and development associated with these LCTs would allow human alteration to harmonize with the surrounding Landscape Character. The LCT would be managed in a High SIO, would be implemented on future projects, and may initiate projects to bring areas where they do not meet the SIO within these LCTs.

Table SMS-1. Landscape Character Theme and Scenic Integrity Objective by Alternative

Sum of %		ALT						
LANDSCAPE CHARACTER	SCENIC_INT_OBJ	ALT 1	ALT 2	ALT 3	ALT4/1985	ALT 5	ALT 6	ALT 7
natural evolving	very high	56.3%	36.7%	29.1%	N.A.	24.9%	30.5%	29.9%
natural appearing	high	33.8%	43.6%	36.6%	N.A.	39.5%	38.7%	49.7%
	moderate	7.3%	17.0%	28.2%	N.A.	2.2%	25.2%	14.7%
	low	0.0%	0.0%	3.5%	N.A.	29.7%	2.8%	3.1%
developed natural appearing	high	1.9%	2.0%	1.9%	N.A.	2.9%	2.0%	1.9%
resort natural setting	high	0.5%	0.5%	0.5%	N.A.	0.5%	0.5%	0.5%
water recreation rural appearing	high	0.3%	0.3%	0.3%	N.A.	0.3%	0.3%	0.3%
Natural* VQO Preservation	very high*	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%
Natural* VQO Retention	High*	0.0%	0.0%	0.0%	12.0%	0.0%	0.0%	0.0%
Natural* VQO Partial Retention	Moderate*	0.0%	0.0%	0.0%	27.0%	0.0%	0.0%	0.0%
Natural* VQO Modification	Low*	0.0%	0.0%	0.0%	36.0%	0.0%	0.0%	0.0%
Grand Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Translation from the Visual Management System terminolgy to Scenery Management System terms. Alternative 4 represents the 1985 Forest Plan direction for Scenic Resources.

Effects on scenic resources from timber management

Effects on scenic resources from timber management can vary depending upon the quantity and type of trees removed, logging methods, and the physical character of the landscape. Generally, timber removal—and any associated roads, skid trails and slash treatments—results in adverse effects to the scenic environment arising from vegetation change or removal and ground disturbance. Impacts from timber harvest are often most dramatic in areas where no change in landscape character has previously occurred. Adverse effects are usually less where disturbances

are already prevalent across the landscape. Thinnings, partial cuts, and selection cuts usually have lower impacts and are evident for a shorter duration than overstory removals, seed tree cuts, and clearcuts. Helicopter logging does not create skid trails or yarding corridors that contribute to the visual impacts of ground-based and cable logging systems. Timber management may also be used to improve scenic quality, particularly where there are opportunities to enhance scenic views, to provide a landscape associated with people's expectations, and to achieve timber stand characteristics that are more visually appealing.

No suited timber production lands would be allowed in Alternatives 1 and 2, making potential effects from it non-existent. Alternative 5 has the most suited timber production lands proposed, and consequently would have the most effect on scenery from this activity because of the total amount of acres available. Alternative 4/1985 Forest Plan is the next highest. Alternatives 3, 6 and 7 have low amounts of suited timberlands. Depending on the type of timber harvest method selected there would be change in the vegetation density, and/or pattern changing the character of the stand and view. Regardless of the alternative selected, all timber harvest will go through site-specific analysis to ensure consistency with adopted objectives for scenery and mitigation measures would be applied to minimize adverse effects.

Effects on scenic resources from fire, insect and disease

For this discussion, it is important to note the overall biological health of the Forest is poor because of fire exclusion and other activities. However, this is from a scientific standpoint, as seen by the casual visitor if the image of the forest is green and forms and patterns appear intact, the casual visitor may consider the Forest to be in good health.

Though processes related to fire, insects, and disease are natural, the casual visitor may perceive the image of one or more of the stages of the ecological cycle as negative. Until the undesirable characteristic (black snags, red canopies in conifer, etc.) is replaced by the next stage of the natural process, the image of the forest could appear damaged or unhealthy to the casual visitor. In areas where disturbance events dominate the landscape, the potential for dramatic visual effects is likely to substantially increase over the long term. It is difficult to predict how or where or when these changes might occur due to influential variables such as vegetation patterns, disturbance regimes, climate, and topography.

For Alternative 1, because of its strong emphasis on allowing nature to take its course, and minimizing human interference with natural processes the image or character of the landscape may have little change within the management time of the proposed forest plan (the short term). However, in the longer-term as the Forest health degrades, effects in vegetation appearance (bug kill, decadence, fire) could occur in Forest landscapes. Such effects could be on large areas with uncharacteristic fires and conversion of aspen types to conifer and back again as cycles occur over time. Should management of the Forest continue with the same emphasis for the duration of time nature takes its course, (amount of time will vary based on vegetation type) positive characteristics could occur as the vegetation types reach their properly functioning condition and become the dominant character of the landscape. As part of this alternative it would be anticipated that because the forest is in a number of different ecosystems that the properly

functioning condition would vary from landscape to landscape and would not all appear positive at the same time.

With Alternative 2 the Forest Service actively initiates prescribed fires and other actions to change vegetation mosaics and increase age class diversity with the intent of trending toward properly functioning conditions. In areas where natural appearing scenery was desired, this alternative would have positive effects on scenery producing a more diverse landscape with greater variety in color, texture and composition.

For Alternatives 3, *6* and *7* a moderate program of prescribed fire and wildland fire treatment could allow a trend toward improving scenery over time.

In Alternative 4, the WCNF does not allow wildland fire use or such extensive use of prescribed fire. In this case, vegetation might continue its trend toward an abundance of over aged stands and decreasing diversity, with insect and disease more prevalent. These are not conditions that favor scenery in the long term.

For Alternative 5, emphasis *on fire* use, while still available, would not affect as many acres. Short term fire evidence from these treatments would not be as prevalent in Alternative 5 as compared to Alternatives 2, 3, *6* or *7*.

Effects on scenic resources from livestock grazing

Historical grazing has caused an estimated reduction in the amount of wildflower (Tall Forb) plant communities by nearly one half (USDA 1998b). While the loss of these wildflower meadows did not occur within the lifetime of current observers, this has affected a change in the visual qualities of these areas (most prominent in the Cache-Box Elder and North Wasatch-Ogden Valley Management Areas). Currently the landscape appearance may include differences in the type and amount of vegetation on the land, vegetation trampling, and range improvement structures. Effects from grazing depend largely on the intensity and timing of forage utilization.

Normally, allotment management plans require permittees to move their livestock so that they do not concentrate in sensitive areas, like meadows and riparian areas. Although there could be effects from seasonal trampling and heavy utilization of the forage, the potential for change to the perceived landscape character is relatively slight by the casual visitor. Structural improvements, such as fences, may be visually evident and can detract from the landscape character of an area. Mitigation may include relocating or redesigning fences where possible, or removing them where they are no longer needed. Generally, improvements are small and localized, and have a minor effect on the Scenic Integrity Objective of the surrounding area. If range allotments were maintained to standard, there would be minimal effect between alternatives.

Effects on scenic resources from recreation management

Effects on scenic resources from recreation activities can result in impacts depending on recreation activity levels, and soil and vegetation types. Off-road and off-trail travel and

undeveloped camping can cause erosion, ground disturbance, or de-vegetation. Although all forms of travel have the potential to cause these types of impacts, effects associated with most forms of motorized travel are usually the most pronounced due to the combination of vehicle weights, widths, and their creation of continuous track lines. In snow-covered landscapes, high numbers of snowmobile or ski tracks across a scenic view can also result in a temporary visual impact.

In addition to the visible effects of activities, recreation developments can contribute to the loss of natural appearance by introducing numerous vehicles, groups of buildings, and conspicuous structures. As with other structures and facilities, the effects range from short to long term in duration and can vary depending on the scale and nature of the development, as well as the desired landscape character.

For Developed Recreation few changes are proposed across the six action alternatives. There ought to be no discernable difference between the alternatives as no developed facilities are selected for closure. While new recreation development is allowable in Alternatives 3, 4, 5, 6, and *7* (in areas where MPCs allow it) changes will be minor from the middleground and background view the change in character by adding the recreation facilities would be seen in foreground view.

Undeveloped recreation use can cause a variety of impacts that affect scenic resources. The effects are typically more pronounced with motorized use due to the weight and size of vehicles and the imprints left on the landscape. Since there is no off-route vehicle travel permitted on the Forest, these impacts are contained, except when accessing undeveloped camping sites within 150 feet of a travel corridor. Non-motorized areas (ROS classes SPNM and P) typically have narrower travel ways that are less visible on the landscape. Visual impacts can also result at high use undeveloped campsites, occurring in both motorized and non-motorized settings. Impacts include: erosion, trampled or complete elimination of vegetation, fire pits, etc. Alternatives 1 and 2, because of emphasis on non-motorized recreation opportunities, will likely have fewer impacts to the scenic resources than the other alternatives.

Regardless of which alternative is implemented, it will be critical to improve education and information programs such as Leave No Trace and Tread Lightly. Travel Plan enforcement will also be key to minimizing impacts from undeveloped use.

Effects on scenic resources from ski resorts

Most of the ski areas on the WCNF are remnants of previous human activities, such as mining or timber harvest, resulting in the vegetation mosaic that lent itself to the open slopes needed for skiing. As the ski industry has progressed more ski runs and other amenities have been added, increasing and opening more slopes to the sport and providing easier access to the open bowls above timberlines. The forms, lines, colors and textures of human altered features have become dominant activity islands within a natural appearing landscape. Many of the communities changed as industry changed and began to support both local and out of town visitors using the canyon bottoms as collecting points by providing restaurants, shops, overnight accommodations, parking lots, roads and support communities for the industry. This built environment repeated

many of the colors and forms found in the surrounding landscape. Recognizing these, human altered landscapes have a long-term effect.

Alternatives 1, 2, 3, 5, 6 and 7 manage the ski resorts within a Resort Natural Setting LCT and High SIO. This LCT manages for positive cultural elements in the base area, ski trails and amenities that borrow from the form, line and color found on the mountain slopes within the permit area of the resort. Alternative 4/1985's LCT for the entire Forest would be Natural and manages the SIO for the base area in Low and Moderate on the mountain slopes. The effects of ski area management to scenery would be the change in the over story of vegetation and how openings and thinning occurs in the permit area in Alternative 1, 2, 3, 5, 6, and 7.

In Alternative 5 ski resorts would be able to expand their permit boundaries, which would change the expansion acres from Natural Appearing LCT to Resort Natural Setting LCT in some ski areas. For ski slopes, this can change landscape character creating obvious runs where natural features were present and add other amenities to allow skiers to access the new expanded areas.

Effects on scenic resources from travel management

Effects on scenic resources from travel management construction, reconstruction, and decommissioning can all affect the landscape character of an area. Road construction and reconstruction are usually associated with timber harvest, facility development, utility corridors, telecommunications sites, mineral and energy development, and recreation activities. Roads and trails create a long-term visual impression on the landscape from associated vegetation clearing and ground disturbance activities. These effects are usually magnified by the linear nature of the pattern of disturbance, especially in forested landscapes. The extent of the impact depends upon topography, service type, soils, geology, and the nature of surrounding vegetation. The visual impact from trails is less due to their smaller width, which reduces the level of ground disturbance and makes impacts easier to mitigate in most cases. Road and trail decommissioning includes a variety of management actions ranging from simple closures to complete obliteration. Obliteration can often eliminate the visual impacts of a road or trail over the long term as vegetation matures in former road or trail locations; however, temporary or short-term effects of ground disturbance are often greater than closures.

No new roads or new trails would be built in Alternative 1, creating the least effect on scenic resources of any alternative. In Alternative 2, which emphasizes active restoration, low amount of new roads would be constructed (a few miles for timber harvest). Alternative 3 and 4 would be second highest in the number of miles of road construction, Alternative 3 would have greater impact because of the level of road construction needed for Oil and Gas development. Alternative 5 would have the highest miles of roads and the greatest effect to scenery because of the size of the road prism needed for Oil and Gas development and also road constructed for timber management. Alternatives 6 and 7 would have a low amount of road construction.

Effects on scenic resources from soil and water management

Under all action alternatives, given the forestwide goal for watersheds, effects to scenic resources should be positive, as systems trend toward properly functioning condition. There will

be a short-term effect during any construction or rehabilitation work, but as vegetation is re-established the changes should appear natural and will have no effect on the landscape character of an area. For Alternative 1, enhancement to the existing landscape character would occur over the long term as natural systems act on watershed and soils. Unfortunately, in some known problem areas, deterioration would occur before natural stabilization takes place.

In Alternative 2, watershed and soil problems that contributed to scenic problems would be corrected more quickly in problem areas than in Alternative 1 through a more active management program. As this alternative is a relatively aggressive restoration for vegetation through prescribed burning, with some associated watershed disturbance, some short-term detraction to scenery is anticipated before longer-term restored landscape character(s) are enhanced (See Topic 1.)

Alternatives *3*, 6 and 7 are similar in the acres of disturbance to watershed through activities. These alternatives would have less short-term effect than Alternative 2. Alternatives 4 and 5 are approximately equal, but have greater effects than Alternatives *3*, 6 and 7, based on acres of disturbance of watershed through a variety of activities. (See Topic 1).

Effects on scenic resources from oil and gas leasing

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" as described in Topic 9 – Oil and Gas. It is estimated to be about 68,300 acres.

Exploratory drilling typically results in some significant visual impacts, particularly in areas that have seen no development in the past. Impacts from exploration activities are usually short-term because of the sight and presence of exploratory equipment. During the exploratory phase the sight of equipment above the overstory of vegetatation would potentially be noticeable for nine to twelve months. If no discovery were made the equipment would be removed and the area reclaimed. Oil and gas activities in the development and production phases typically result in long term impacts, but are less significant than the exploratory phases. Visual impacts from all phases of oil and gas activity are usually mitigated when reclamation of the site is complete.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alt 4) an area of existing leases, the Table Top Unit, could be explored and result in effects to scenic resources. The degree to which the Table Top Unit is explored is affected by whether or not new leases could be issued and under what stipulations.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect scenic integrity of an undisturbed landscape. The scenic integrity of the area could be affected on an estimated 20 acres because of oil and gas exploration activities. Mitigation applied to existing leases could reduce effects by screening with vegetation or topography. Sensitive viewpoints could be affected until reclamation is effective. Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could affect the scenic integrity on about 20 acres. Once the existing leases expire, new leases could be issued, but surface occupancy would not be allowed. Nearby directional drilling from outside the area could affect some sensitive viewpoints.

Alternative 3 precludes leasing availability in areas recommended for Wilderness in the future and does not allow new leases with surface occupancy in areas managed for undeveloped and backcountry recreation values. Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. An estimated 10,400 acres are available under Standard Lease Terms. Oil and gas exploration and development are estimated to disturb about 75 acres. Some of the effects to scenery could last 20-30 years because of field development. Some of this development is predicted on existing leases within the Table Top Unit. In new leases a Controlled Surface Use stipulation would be applied to areas with high or moderate scenic integrity level to maintain the valued scenic integrity of an area.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to scenery are probable.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to disturb about 105 acres. Because the landscape is relatively undisturbed, scenic resources would be significantly affected. Some of the effects could last 20-30 years because of field development. Mitigation in the form of road rehabilitation, and the use of noncontrasting colors on structures, would help to minimize or avoid the impacts. Other mitigation measures that could be required would include moving the site up to 200 meters (656 feet) if the site could be better screened by vegetation or topography, delaying activities for up to 60 days to avoid periods of high use by forest visitors, and painting of facilities to help blend them into the surrounding environment.

In Alternative 6, new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized undeveloped recreation values and terrestrial habitat. Within this area a Controlled Surface Use stipulation would be applied to areas with high or moderate scenic integrity level to maintain the valued scenic integrity of an area. In the remainder of the area the effects to scenic resources would be minimal because of no surface occupancy.

Alternative 7 would preclude leasing on 20,400 acres recommended for Wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb about 85 acres. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy. Because the landscape is relatively undisturbed, effects to scenic resources could be dramatic. Some of the effects could last 20-30 years because of field development. Within the area that allows suface occupancy a Controlled Surface Use stipulation would be applied to areas with high or moderate scenic integrity level to mitigate effects and maintain the valued scenic integrity of an area. To the extent possible, effects to sensitive viewpoints would be reduced by screening oil and gas activities with vegetation or topography until reclamation is effective.

Impacts to the visual resources could occur as a result of the development of private minerals. Oil and gas activities on lands with private minerals are not required to meet Forest Plan guidelines for scenic resources.

Cumulative Effects

The method of analysis is to describe the cumulative effect issues describe the cumulative effect area and the time frame for analysis; identify past, present and reasonably foreseeable actions; and present the cumulative effects among the alternatives.

Issues
The main issue identified under scenery management is updating from the Visual Management System to the Scenery Management System and providing new direction and desired future conditions for WCNF National Forest System Lands.

Cumulative Effects Area and Time Frame
The cumulative effect area is within approximately two hours of the main population centers of Salt Lake City, Ogden, Logan, Tooele and Park City that provides scenery and scenic backdrop for these communities. The time frame is from the previous planning period through the next planning period or approximately 10 to 15 years before and after the present time.

Past, Present and Reasonably Foreseeable Actions
The environmental consequence section describes effects to scenery from various topic areas. Of these topic areas, the primary topics that could cumulatively affect scenery management are from timber management; fire, insect and disease; livestock grazing; recreation management; ski resorts; travel management; soil, water and management; and oil and gas leasing.

Cumulative Effects
The Forest Service has provided a new system for evaluating and managing scenic resources. This system is a reflection of the recognition by the agency that landscape amenity values are very important to people. While this recognition is true and federal land managers can and should be relatively sensitive to effects on scenery, the same is not always true beyond public lands.

The visual landscape beyond the forest boundary is changing quickly. Urbanization continues along the Wasatch Front and in valleys on the east side of the range. Rural agricultural and residential expansion push toward the North Slope of the Uintas. Towns and communities are growing together, and subdivisions and recreation homes encroach on public lands. It is expected that this will continue as our population grows and transportation and other infrastructure and commercial systems expand. (See Social and Economic section).

Topic 5 – Wilderness Characteristics, Roadless Area Values, and Wilderness Management

The organization and content under this topic has been changed considerably since the publication of the DEIS.

The first section of Topic 5 presents general information on inventoried roadless areas on the Wasatch-Cache. After that Topic 5 is separated into three sections:

- Effects on wilderness characteristics.
- Effects on roadless area values.
- Wilderness Management

Additions and changes to the analysis in the FEIS for roadless areas

In the DEIS for the Wasatch-Cache Forest Plan (May, 2001) the analysis of roadless areas focused mostly on their capability, availability and need as potential designated Wilderness, (See Appendix C, DEIS). The Roadless Area Conservation Rule for the protection of roadless areas from timber harvest and road building was applied to Alternatives 1, 2, and 6 in the DEIS. For Alternatives 3, 4, and 5 different allocations were used for roadless areas that would allow some of these uses and other uses that could negatively affect roadless values. Little definition or recognition of the different values of the areas was presented, except for their potential as recommended Wilderness.

After public comments received on the DEIS, with the changing of policy from the Clinton to the Bush administrations, and with the injunction of the U. S. District Court in Idaho on implementation of the rule (May 12, 2001), a different strategy for allocations related to roadless areas was appropriate. The Intermountain Region and the Wasatch-Cache determined that additional scrutiny and consideration of individual roadless area values was needed, so that Forest Plan decisions might be made with a fuller awareness of the undeveloped values of each area, as well as its potential for a variety of uses.

A new appendix to the FEIS, Appendix C-2, is added which inventories roadless area characteristics and values originally described in the Roadless Area Conservation DEIS (May, 2000). Effects to these values by alternatives for each roadless area are also presented in that appendix.

Appendix C to the DEIS which evaluates individual roadless area capability, availability and need for recommendation as Wilderness is now called Appendix C-1. Most changes to Appendix C-1 from Appendix C of the DEIS are minor, moving some analysis data to Appendix C-2, or adding additional explanation of planning considerations regarding the Roadless Area Conservation Rule.

Introduction

"Roadless Areas" refer to areas that are without constructed and maintained roads, and that are substantially natural. Some types of improvements and past activities are acceptable to be included in roadless areas.

In the past, roadless areas were only looked at for their potential for wilderness recommendation. It is now recognized that roadless areas have significant ecological, as well as social values. The values of roadless are of both local and national significance. Roadless areas are often aquatic strongholds for fish; provide critical habitat and migration routes for many wildlife species especially those requiring large home ranges and key watershed areas for communities and wildlife. The recognition of the values of roadless areas is increasing, as the population continues to grow and as the demand for outdoor recreation and other uses of the forests increases. These unroaded and undeveloped areas provide the Forest with opportunities for potential wilderness areas, non-motorized and limited motorized recreation, and other commodity and amenity uses.

This section describes and evaluates the effects to wilderness characteristics within inventoried roadless areas, makes considered different recommendations for Wilderness across the alternatives, and the effects to roadless area values and characteristics defined in Appendix A, Forest Service Roadless Area Conservation DEIS (May, 2000).

Laws, Policy, and Direction

- **The Code of Federal Regulations at (36 CFR 219.17(a)):** States that roadless areas shall be evaluated and considered for recommendation as potential wilderness during the forest planning process.

- **The Forest Service Handbook (1909.12.7.1):** Directs to identify and inventory all roadless areas and details the means by which the capability, availability, and need for potential wilderness areas is assessed.

- **The Intermountain Draft Roadless Inventory and Evaluation Guide (dated 06/30/98):** expands upon the Forest Service Handbook on the inventory and evaluation phases of roadless area analysis.

- **The Roadless Area Conservation Final Rule (RACR) and Record of Decision (36 CFR Part 294):** Established prohibitions on road construction, road reconstruction, and timber harvesting in inventoried roadless areas on National Forest System lands. Its intent is to provide lasting protection for inventoried roadless areas within the National Forest System in the context of multiple-use management. This Rule is currently being reviewed by the Bush administration, and was enjoined from implementation by a Federal Court in 2001.

- **Forest Service Manual Interim Directives 1920-2001-1, 2400-2001-3, and 7710-2001-2,3:** These directives implement the Chief of the Forest Service's direction on interim protection

of inventoried roadless areas while court and administrative proceedings regarding the RACR are completed.

Affected Environment

There are 34 roadless areas on the Wasatch-Cache National Forest, totaling approximately 606,400 acres. This represents almost half of Wasatch–Cache National Forest. The Mount Naomi, Swan Creek and Gibson roadless areas are shared with the Caribou National Forest. Nobletts and White Pine roadless areas are shared with the Uinta National Forest. Widdop Mountain roadless is shared with the Ashley National Forest. The High Uintas roadless is shared with both the Ashley and Uinta National Forests. The Stansbury roadless area is contiguous with the North Stansbury and Big Hollow BLM Wilderness study areas. Most roadless acreage on the Forest is within Utah, except for 652 acres of the High Uintas roadless area is in Wyoming.

The previous roadless inventory was completed in 1983 and identified 22 roadless areas totaling 746,431 acres. (Table C-1-1 and Appendix C-1 account for changes to roadless areas and their acreages between the 1983 inventory and the publication of this FEIS.) In 1984, the Utah Wilderness Act was enacted and designated several roadless areas as wilderness, including six on the Forest (High Uintas, Mount Naomi, Wellsville Mountains, Mount Olympus, Twin Peaks and Deseret Peak). The seventh wilderness area on the Forest, Lone Peak was designated wilderness in the 1978 Endangered American Wilderness Act. When this forest plan revision effort was begun a new and updated inventory was needed to address ongoing roadless area management issues and to meet the requirements of the NFMA regulations and the Utah Wilderness Act of 1984. Each undeveloped area on the Forest identified during the inventory contains 5,000 acres or more or was adjacent to an existing wilderness area.

Because different criteria were used for the 1999 inventory than those used in 1983, ten additional areas were identified as roadless, and other areas were combined or split apart.

New roadless areas identified were Temple Peak, Right Hand Fork, Mahogany Range, Boulder Mountain on the Logan District, Sugar Pine, Lamb Canyon, Public Grove Hollow and Rock Creek – Green Fork on the Ogden District and Hogsback and the Lone Peak additions on the Salt Lake District.

The Mt. Logan roadless area defined in the 1983 inventory is now split into new three roadless areas: Mt. Logan-North, Mt. Logan-South, and Mt. Logan-West. Each is more than 5,000 acres.

Three additional roadless areas were added to the inventory as a result of comments received on the DEIS and through internal Forest Service review. These are:

- Elk Valley
- Mueller Park
- Red Butte

Also, between the DEIS and FEIS the Francis roadless area was redefined because of further examination by the interdisciplinary team (See Appendix C for rationale.) It now includes

acreage that had been called North Francis, Middle Francis, and South Francis roadless areas. Previously the Middle and South Francis areas had been dropped from consideration as roadless as being too small. The Francis roadless area is greater than 5,000 acres.

Finally, three roadless areas which were originally identified during the inventory process and were tracked in the DEIS have been dropped from consideration as Wilderness or for their values associated with the Roadless Area Conservation Rule (2001) in this FEIS as they do not meet minimum size criteria. These areas were shown on alternative maps presented with the DEIS, but have been removed from maps relating to the FEIS. Table C1-1, in Appendix C-1 to this FEIS provides some additional information on these areas and their status. These are:

- Public Grove Hollow - This was a new area identified on Ogden District in 1999. Further examination showed it was too small to meet minimum size criteria.
- Lamb Canyon – This was a new area identified on Ogden District in 1999. It is too small to meet minimum size criteria.
- Little West Forks Black - This was a roadless area that was identified in the 1983 inventory and carried into the 1999 inventory. Further examination of the area indicates that shows that it is two separate smaller two areas separated by a road. Neither of the smaller areas meets minimum size criteria.

Table RA-1 displays each roadless area by management area, acreage for each area and the Ranger District that manages the area.

Table RA-1 Roadless Area Inventory by Management Area

District and Forest	Roadless Area Name By Management Area	Acres *
Logan and Ogden	**Cache – Box Elder** (*12* areas)	
	Gibson	5,300
	Mount Naomi	45,100
	Temple Peak	23,400
	Right Hand Fork Logan	15,000
	Mount Logan North	19,200
	Mount Logan South	17,000
	Mount Logan West	5,300
	Boulder Mountain	8,800
	Elk Valley	*8,200*
	Mahogany Range	11,400
	Mollens Hollow	17,700
	Wellsville Mountains	1,800
	Total:	*178,200*
Logan and Ogden	**Bear** (*3* areas)	
	Swan Creek	9,400
	Rock Creek - Green Fork	5,600
	Sugar Pine	5,600
	Total:	*20,600*

District and Forest	Roadless Area Name By Management Area	Acres *
Ogden and Salt Lake	**North Wasatch – Ogden Valley** (*8* areas)	
	Upper South Fork	17,300
	Willard	19,100
	Lewis Peak	12,100
	Burch Creek	6,900
	Francis	*14,800*
	Farmington	10,900
	Hogsback	7,900
	Mueller Park	*7,700*
	Total:	*96,700*
Salt Lake	**Central Wasatch** (*6* areas)	
	Red Butte	*6,200*
	Mount Aire	9,700
	Twin Peaks	6,200
	Mount Olympus	10,000
	White Pine	1,900
	Lone Peak (Additions)	900
	Total:	35,000
Rock Creek - Green Fork Salt Lake	**Stansbury** (1 area)	
	Stansbury Mountains	39,700
Kamas and Evanston	**Western Uintas** (3 areas)	
	Nobletts	3,100
	Lakes	122,000
	High Uintas (part of)	46,100
	Total:	171,200
Evanston – Mountain View	**Eastern Uintas** (*2* areas)	
	High Uintas (part of)	57,000
	Widdop Mountain	8,000
	Total:	*65,000*
Wasatch-Cache National Forest	**All Roadless Areas Total:**	606,400

*Since the DEIS acreage figures for roadless areas have been rounded to the nearest 100 acres

Information about state and private inholdings, unconstructed roads, motorized trails and mechanized trails provides perspective about potential tradeoffs should a roadless area be recommended for Wilderness.

Private and State Inholdings

Private and state land was excluded wherever possible from the inventoried roadless areas. There are a few isolated parcels of Utah State and private land that were included, because they were surrounded by large acreages of National Forest roadless land. Table RA-2 lists state and private land inholdings that are completely within an Inventoried Roadless Area. Table RA-2 does not display private and state lands that are either adjacent to roadless areas or excluded by a cherry-

stem (surrounded on 3 sides by roadless). Determining land ownership for non-federal and state lands can be complicated and accuracy depends on when land sales or exchanges have occurred and when that information is recorded with the state and county governments.

Table RA-2 Private and State Inholdings within Inventoried Roadless Areas

Roadless Area	Owner	Number of Parcels	Acres
Mount Naomi	Private	1	158
Elk Valley	*Utah State*	*1*	*629*
Rock Creek – Green Fork	Private	1	40
Willard	Private	5	752
Willard	State of Utah	3	138
Burch Creek	State of Utah	1	586
Francis	*Private*	*1*	*40*
Mueller Park	*Private*	*1*	*79*
Mount Olympus	Private	1	57
Twin Peaks	Private	5	148
Twin Peaks	Salt Lake City	2	128
White Pine	Private	1	117
Lakes	Private	1	80
Lakes	State of Utah	1	80

Unconstructed Roads in Inventoried Roadless Areas

Constructed roads were excluded from the inventoried roadless areas; however, unconstructed roads were included. Table RA-3 displays the few unconstructed roads that are designated open on District travel plans within inventoried roadless areas.

Table RA-3 Unconstructed District Travel Plan Roads in Inventoried Roadless Areas

Roadless Area	Road Name/Number (miles)
Mount Logan North	Welches Flat 4x4 20152 (3.6), Logan Peak 20042 (0.9), Pine Spring 20167 (0.3)
Mount Logan South	South Fork Millville 4x4 20023 (2.5), Breaks 4x4 20053 (.8)
Elk Valley	*Elk Valley Road 039 (2)*
Willard	Grizzly Peak 20091 (.6)
Mueller Park	*Rudy's Flat 4X4 80285 (1.0)*
Red Butte	*Upper Red Butte 80235b (5.0 - not open for use)* *Parleys Fork 4X4 80224 (1.0 - not open for use)*
Stansbury Mountains	Box Elder Canyon 80584 (0.4)
Lakes	Norway OB 83137 (0.4), Pole Sale 80496 (1.2), Kathy's Spur 0.2), South Fork Weber 80031 (.1)
Little West Fork Blacks	Upper Little West Fork Blacks 80804 (1.5), Stateline 80393 (4.2), Hewinta Junction 80433 (0.2)

Motorized Trails in Inventoried Roadless Areas

Motorized trails were included in the inventoried roadless areas. Some trails are only partly included within a roadless area with the rest of the trail outside the roadless area. Only system trails in approved travel plans are included. The Evanston/Mountain View travel plan is currently being revised. Table RA-4 displays motorized trails open within inventoried roadless areas.

Table RA4
Motorized System Trails
in Inventoried Roadless Areas

Inventoried Roadless Area	Number of Motorized Trails	Approximate Mileage in Roadless
Temple Peak	4 trails	10.3
Right Hand Fork Logan	4 trails	6.4
Mount Logan North	2 trails	4.0
Mount Logan South	3 trails	10.2
Elk Valley	*2 trails*	*5.7*
Mollens Hollow	7 trails	7.5
Willard	4 trails	8.0
Lewis Peak	6 trails	16.5
Hogsback	3 trails	2.0
Mueller Park	*2 trails*	*5.9*
Twin Peaks	1 trail	2.8
Mount Olympus	1 trail	.2
Stansbury	4 trails	16.8
Lakes	10 trails	13.2
High Uintas	14 trails	16.4

Sources: District Travel Plans and GIS mapping.

In addition, almost all roadless areas on the Forest have some trails used by mountain bikers. Topic 4 – Recreation includes further information about trails open to mechanized (mountain bike) use and the effects to users of those trails from inventoried roadless area management.

Inventoried Roadless Area Evaluation for Wilderness Recommendation

Additions to the National Wilderness Preservation System are a long-term commitment made only by Congressional designation. During the forest planning process, national forests are required to inventory their roadless areas, evaluate the wilderness values of these areas, and recommend to Congress those areas that meet the capability, availability and need criteria for wilderness designation. For a detailed description and map of each roadless area being considered in the wilderness evaluation process and rationale on capability, availability, and need for each roadless area, see Appendix C-1 of the FEIS.

Environmental Consequences for Wilderness Characteristics

General Effects

In this section effects on inventoried roadless areas are considered with regard to effects on Wilderness character. Wilderness characteristics include solitude, the naturalness of the environment, opportunities for primitive recreation and challenging experiences and other special values. Appendix C-1 describes the wilderness characteristics of each inventoried roadless area. This evaluation assumes areas assigned the 1.5, 2.4 and 2.6 management prescriptions will maintain the wilderness characteristics described in Appendix C-1.

Appendix C-1 of this document contains detailed information about each individual inventoried roadless area with respect to its potential Wilderness character, the process used to evaluate the areas, the acreage of specific areas that were recommended for wilderness in each alternative and location maps. Tables are also included in Appendix C-1 that list by alternative the amount of wilderness acres recommended, acres protecting roadless values, and miles of motorized travel plan trails and roads open.

In this analysis, the Roadless Area Conservation Rule (RACR) has been applied in Alternatives 1, 2, and 6. Effects on inventoried roadless area management have been evaluated with the consideration that under the RACR, road construction and reconstruction are not allowed in inventoried roadless areas nor is cutting, sale, or removal of timber except: for the cutting, sale or removal of generally small diameter trees which maintains or improves roadless characteristics and: 1) to improve habitat for threatened, endangered, proposed, or sensitive species, or 2) to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects.

Protection of Wilderness character can be evaluated by prescription and by the intent expressed in the alternative theme. Table RA-5 shows the total inventoried roadless acres recommended for wilderness, and total acres of wilderness characteristics protected (prescriptions 1.5 + 2.4 + 2.6.). The acreage managed under management prescription 2.4 (Research Natural Areas) does not vary substantially across alternatives when it is considered in the context of the overall size of the roadless/Wilderness protection issue and the effects of differences between alternatives with respect to Wilderness character.

Alternative 1 has the largest Wilderness recommendation (64% or roadless acreage) and a large amount of acreage managed under management prescription 2.6; it also applies the protections the National Roadless Area Conservation Rule to all inventoried roadless areas. Because of these factors it is the alternative that is most protective of Wilderness character.

Alternative 2 also provides the second largest Wilderness recommendation (24% of roadless acreage) and applies the 2.6 prescription to more acres than in any other alternative.

Alternative 3 provides for the smallest Wilderness recommendation (8% of roadless acreage) and protection of Wilderness character of any alternative that recommends Wilderness.

Alternatives 4 and 5 are not intended to manage roadless areas to protect Wilderness character.

Alternatives 6 and 7 are similar in the acreage recommended for Wilderness (11 and 12 % of roadless acreage respectively). Looking more closely, two primary differences are that 1) in Alternative 6 a portion of the Mt. Naomi roadless area adjacent to the south end of Mt. Naomi Wilderness is recommended for wilderness that is not recommended in Alternative 7, and 2) in Alternative 7 the Lakes recommended wilderness is larger than in Alternative 6. Alternative 7 also refined mapping done in Alternative 6 to provide a more manageable boundary for the proposed High Uintas Wilderness and to provide for more active management treatment in some roadless areas of the High Uintas that were not recommended for Wilderness.

Table RA-5
Recommended Wilderness and
Wilderness Character Protected by Alternative*

Prescription	Alternative						
	1	**2**	**3**	**4**	**5**	**6**	***7***
1.5 Recommended Wilderness (acres)	387,000	145,500	51,100	0	0	69,000	*73,300*
2.4 RNAs and 2.6 Undeveloped Areas (acres)	157,900	164,500	89,000	6,140	5,300	93,000	*116,100*
Total	544,900	310,000	140,100	6,140	5,300	162,000	*189,400*

*Acres in this table may vary slightly from acreages presented in other tables on roadless due to differences in rounding.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Road Construction

Road construction can permanently affect Wilderness character, altering a natural appearing landscape. No road construction is allowed in Alternative 1, 2, or 6 in roadless areas, as covered by the Roadless Areas Conservation Rule. In Alternatives 3, 4, 5 and 7 a few miles of road construction are allowed in roadless areas.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Timber Management

Timber management could affect wilderness characteristics in inventoried roadless areas by detracting from a sense of solitude during timber harvest activities and for the longer term by altering the natural environment with tree removal and road construction. Alternatives 1, 2, and 6 would have the least effects on wilderness characteristics from timber removal because the National Roadless Area Conservation Rule was applied in their development and generally prohibits road construction and the cutting, sale and removal of timber, except for removal of generally small diameter trees which maintains or improves roadless characteristics, TES species habitat, and maintains or restores ecosystem composition and structure. Wilderness

characteristics in inventoried roadless areas have the greatest potential to be altered in Alternatives 4 and 5, which allow timber harvest on 155,000 and 158,000 acres of tentatively suited inventoried roadless areas respectively. Alternative 3 allows timber harvest on about 61,000 of these acres. In Alternative 7, timber harvest is allowed on 64,000 acres.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Vegetation/Fuels Treatment

Wilderness characteristics could be affected by mechanical vegetation and fuels treatments. Estimates of the acres of these treatments by alternative are quite small compared to total inventoried roadless acreage. As oakbrush treatment is most likely in fire prone areas in urban interface (non-roadless areas), it is unlikely that any wilderness characteristics within inventoried roadless will be affected by these potential treatments. Of the 7 alternatives, Alternative 7 has the largest acreage proposed for oakbrush mechanical treatments. Similarly, mechanical vegetative treatments in aspen/conifer would most likely occur in roaded areas far more often than in areas where not roads are present. Alternatives 2 and 4 proposed the most aspen/conifer treatment. (See Table 2-2.)

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Fire Management

Fire management includes wildland fire use, prescribed fire, and fire suppression. Wilderness characteristics of solitude, primitive recreation experiences and natural landscapes (untrammeled by human activities), are not likely to be affected by the allowance of wildand fire use and prescribed fire in inventoried roadless areas. Wildland fire use that is allowed in all alternatives, is a natural occurring event, is thus entirely compatible with wilderness character. Prescribed fire is allowed in all inventoried roadless in all alternatives except Alternative 1. In Alternatives 2-7 prescribed fire could change the appearance and functioning of vegetation, watershed, soils and other elements in natural systems that are integral to the wilderness setting and experience. However, modifying these effects might be to a landscape, they are not outside the capacity of natural systems to produce such effects, and thus are not likely to affect overall wilderness character. The landscape is not necessarily any less natural, and primitive recreation experience or availability of solitude are not necessarily lessened. Fire suppression activities are possible in any in inventoried roadless (even recommended wilderness) depending on potential risks to life and if risks to values outside a roadless (read recommended wilderness) are ascertained. Choices for suppression techniques would require consideration of effects on roadless values and wilderness characteristics, and employ minimum tool philosophies in alternatives where wilderness had been recommended: Alternatives 1, 2, 3, 6, and 7.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Recreation Management

Recreation management could allow user densities to increase so that wilderness characteristics of solitude are impaired or the natural environment is altered by human recreation use. By recommending large amounts as wilderness in Alternative 1, solitude and remoteness are more

likely to be maintained because motorized and mechanized access would not be allowed. The risk of effects to the naturalness of the environment caused by improper off road use by vehicles is lessened. Effects on wilderness characteristics from Alternatives 2, 3, 6 and 7 could be somewhat greater than in Alternative 1, because less area is recommended as wilderness. Recreation as practiced in Alternatives 4 and 5 poses the greatest risks to wilderness characteristics in inventoried roadless areas, as no acres are recommended as wilderness and user densities and use types are likely the least compatible with wilderness characteristics.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Recreation Use

Alternatives that provide for the highest percentage of primitive or semi-primitive non-motorized recreation in inventoried roadless areas are those that are most protective of wilderness characteristics. As such, Alternative 1 best protects Wilderness Characteristics, followed in descending order of protection of Wilderness characteristics by Alternatives 2, 7 and the Existing Condition, 6, 3, and 5. The 1985 Forest Plan as mapped provided only 209,800 acres of semi-primitive non-motorized. (See Table RA-11 in the section that follows this on Effects on Roadless Area Values for acreages of ROS within inventoried roadless areas.)

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Winter Motorized Recreation Use

The Wilderness characteristics of solitude and a primitive recreation can be adversely affected by the use of snowmobiles. In Alternatives 1-6 snowmobiling is not allowed in any recommended Wilderness, so there would be no effects to wilderness characteristics from snowmobiling in these alternatives in those roadless areas protected by a wilderness recommendation. In roadless areas not recommended for wilderness in Alternatives 1-6, snowmobiling will detract from a primitive winter recreation experience. In Alternative 7, snowmobiling is allowed in recommended wilderness where current use exists. Snowmobile use (noise, fumes, tracking of snow conditions, possible effects on wintering wildlife) will affect wilderness character in these areas during the periods in which the use occurs. In Alternative 7, areas in which wilderness characteristics may be affected by snowmobiling are 38,000 acres in the Lakes recommended wilderness, 2125 acres the High Uintas recommended wilderness, and 48 acres in Upper South Fork recommended wilderness.

Like snowmobiling, in all alternatives where heliski operations are allowed (Alternatives 3-7), heliski operations can be expected to negatively affect primitive winter recreation and solitude. This detracts from wilderness character. Heliski operations, however, are not allowed in any recommended Wilderness in any alternative, therefore cannot effect wilderness characteristics in those roadless areas where wilderness has been recommended.

Effects on Wilderness Characteristics in Inventoried Roadless Areas from Oil and Gas Activities

The following description of effects refers only to the area identified as the “Appeal Settlement Zone” as described in Topic 9. It is estimated to be about 68,300 acres.

Oil and gas activities such as exploratory drilling, oil and gas field development and other activities that involve the construction of roads, wellsites and other facilities would adversely affect the naturalness, remoteness/solitude, integrity, and other wilderness characteristics. The impacts associated with the drilling of a single exploratory well would adversely affect the characteristics associated with the roadless areas. These impacts would be of relatively limited area and of short duration and once drilling and reclamation is completed the impacts to the roadless characteristics would not be significant. However, some evidence of human activities would be present for a long period. These impacts may be of relatively high intensity and long duration if they are associated with oil and gas field development and the subsequent production of oil and gas. The impacts associated with a producing oil and gas field would be long term and significant. Vehicular traffic and human activities associated with a developed oil field would directly affect the sense of remoteness and solitude. The presents of roads, wellsites, pipelines and other facilities would be incompatible with the natural integrity. If oil and gas were discovered and production undertaken, there would be a direct loss of roadless acres for the life of development and for some time after while reclamation returns the area to a more natural setting.

The decision being made in the Forest Plan affects new leases not existing ones. In all alternatives (except Alternative 4), an area of existing leases, the Table Top Unit, could be explored and result in effects to wilderness characteristics.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect the wilderness characteristics within the inventoried roadless area. These characteristics could be affected on an estimated 20 acres because of oil and gas exploration activities. Once existing leases expire, Alternative 1 provides the greatest protection to wilderness characteristics. Alternative 2 is very similar. Again, development of existing leases within the Table Top Unit could affect the wilderness characteristics on about 20 acres. Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining available acres, new leases could be issued but surface occupancy would not be allowed. No direct impacts to the wilderness characteristics within the inventoried roadless areas would occur but there may be some indirect affects to solitude and remoteness if directional drilling occurred from adjacent lands since an access road would likely be constructed to the drill site and the sounds associated with construction and drilling may be heard within the inventoried roadless area.

Alternative 3 precludes new leases in areas recommended for wilderness and does not allow surface occupancy in areas managed for undeveloped, backcountry recreation values areas of terrestrial habitat. Additional new leases could be issued outside the areas listed above with stipulations applied to protect sensitive resources. Oil and gas activities are estimated to disturb the natural appearance on about 75 acres. Some of the development predicted from existing leases within the Table Top Unit could be within areas high in wilderness characteristics. Solitude and remoteness could be affected on a much larger scale. Some of the effects to wilderness characteristics could last 20-30 years because of field development.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely.

Alternative 5 would provide for leasing with standard lease terms, and therefore provide the greatest opportunity for full field development. Wilderness characteristics could be significantly affected. Oil and gas activities are estimated to disturb the natural appearance on about 105 acres. The solitude and remoteness could be affected to a greater degree because of the sights and sounds of development beyond the actual disturbed area. Some of the effects to wilderness characteristics could last 20-30 years because of field development.

In Alternative 6, new leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed in areas managed for motorized recreation values and terrestrial habitat in the lower part of the Hayden Fork, Stillwater Fork and East Fork of the Bear River drainages. The wilderness characteristics present in these areas would continue to be affected. Within this area the degree of effects from Alternative 6 is less than Alternative 3. In the remainder of the area the effects to wilderness characteristics would be minimal because of no surface occupancy.

Alternative 7 would not allow leasing on 20,400 acres recommended for wilderness. About 20,900 acres would be leased with no surface occupancy. Under these two situations, wilderness characteristics would be maintained. Surface occupancy would be allowed on the remaining 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb the natural appearance on about 85 acres. The solitude and remoteness could be affected to a greater degree because of the sights and sounds of development beyond the actual disturbed area. Some of the effects to wilderness characteristics could be affected 20-30 years should a field be discovered. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Effects on Wilderness Characteristics from Mineral and Land Ownership

Several inventoried roadless areas have privately owned minerals. Since the federal government has no authority to deny development of those minerals, they pose a risk to wilderness characteristics in inventoried roadless areas should they ever be developed. Privately owned minerals pose the greatest risk to wilderness characteristics in recommended wilderness. Alternative 1, followed by Alternatives 6, 3, and 7 have the most acres in recommended wilderness with private minerals. Alternative 2 has only a few acres of private minerals. Alternatives 4 and 5 have none, because there is no recommended acreage. Roadless areas with wilderness recommendations that have a high percentage of their acreage with private mineral rights are Upper South Fork, Burch Creek, Twin Peaks (Deaf Smith and Little Cottonwood portion), and Lone Peak. The High Uintas roadless area has 6,500 acres of private minerals, although this is only about 6% of its total acreage.

Table RA-6
Mineral Ownership in Recommended Wilderness

Alternative	Federal Surface and Minerals	Federal Surface and Private or State Minerals
1	344,531	44,193
2	145,778	155
3	42,590	8,873
4	0	0
5	0	0
6	61,017	8,944
7	65,065	8,416

Surface land ownership can also pose a risk to wilderness characteristics in inventoried roadless areas should they ever be developed.

There is one private inholding remaining in the Mount Olympus Wilderness and two private inholdings remaining in the Twin Peaks Wilderness. The other four wilderness areas on the Forest have no private inholdings. Alternative 1 includes the most amounts of private and state inholdings within recommended wilderness, Alternative 2 has some, and other alternatives have none. Alternatives also vary by the amount of recommended wilderness adjacent to private land. Alternatives 1 and 2 have the greatest amount of miles of private land next to recommended wilderness, which may affect access and increase the potential for motorized trespass. The Upper South Fork roadless area (recommended for wilderness in Alternatives 1, 3, 6, and 7) is almost completely surrounded by private land.

Table RA-7
Adjacent Private Land
Miles Next to Recommended Wilderness

Alternative	Miles of Adjacent Private Land next to Recommended Wilderness
1	169
2	15
3	28
4	0
5	0
6	30
7	*26*

Cumulative Effects

Other Forests in the state of Utah are completing forest plans or scheduled to complete them. The Uinta and Caribou National Forests are planning concurrently with the Wasatch–Cache. The Ashley National Forest is scheduled to begin Forest Plan revision in the near future.

Alternatives presented in these forest plan revisions have some recommended wilderness adjacent to the Wasatch-Cache.

Generally, much of the roadless areas recommended for wilderness in all alternatives are typical of wilderness that has already been designated both nationally and within the state of Utah and will not significantly add to the diversity of lands in the Wilderness Preservation System. An exception to this is the Upper South Fork roadless area, which is somewhat different than much of the current higher elevation wilderness areas. Currently, large tracts of lands administered by the Bureau of Land Management in the state of Utah are being evaluated for wilderness proposals. Additions of these lands to the system could generally add more land type diversity than much of the additional National Forest roadless lands. The BLM does have adjacent Wilderness Study Areas on the north and south ends of the Stansbury roadless area.

Some of the best snowmobiling opportunities in the nation and state are on roadless areas of the Wasatch-Cache. Alternatives with high amounts of recommended wilderness could significantly affect winter motorized recreation use on the Forest, except in Alternative 7, which accommodates some use by allowing use in recommended Wilderness where there is existing snowmobile use. There are also significant summer motorized travel plan trail opportunities in several roadless areas. Motorized recreation users could be displaced to other lands in alternatives with large Wilderness recommendations (Alternatives 1, and 2.) If other national forests and public land management agencies were to adopt similar alternatives, snowmobiling, motorized recreation, and undeveloped motorized camping could be reduced in the surrounding public lands.

Ultimately, in all alternatives, with projected population growth, demand for high quality wilderness recreation opportunities on the forest will be exceeded by user numbers, especially in smaller Wilderness adjacent to population centers. Under Alternatives 3, 4, and 5, it is expected that growth in demand for motorized recreation and non-motorized might be met for a longer period of time by allowing more of these uses on the Wasatch-Cache.

Environmental Consequences for Roadless Area Values

General Effects

<u>This is a new section in the FEIS</u>. It describes <u>general effects to roadless area values</u> from the Wasatch-Cache forest plan alternatives. Appendix C-2 is also new, and closely related to this general effects section. Appendix C-2 provides detailed information on the methods used to assess roadless area values, the values of each roadless area on the Wasatch-Cache, and effects on each area from alternatives.

Introduction - Values of Roadless Areas

Roadless areas possess social and ecological values and characteristics that are becoming scarce in an increasingly developed landscape. They provide unique opportunities for non-motorized and motorized recreation in a primitive or semi-primitive setting, sources of clean drinking water, and large undisturbed landscapes that offer privacy and seclusion. These areas support a

diversity of habitats for native plants and animal species, conserve biological diversity and provide opportunities for study and education. The roadless areas in the Wasatch-Cache National Forest provide these values to differing degrees. Some areas have very large, pristine, undisturbed environments, while others are less diverse and have areas that reveal past or current development and in some cases, resource damage.

High, Medium, and Low Value Roadless Areas

The 34 roadless areas identified on the forest were evaluated individually in Appendix C-2. An interdisciplinary team exercise was conducted to summarize this information on each roadless area, and sort the 34 areas into three sets, those of high value, medium value or low value with respect to their overall need for protection of their roadless values. Every roadless areas had at least one highly rated roadless value, however, a few areas had a preponderance of higher rated values, more moderate values or lower values. In the interdisciplinary team's judgment, the following division was made.

<u>Roadless areas of High value (5): (326,800 acres)</u>

- High Uintas
- Mt. Naomi
- Upper South Fork
- Stansbury
- Lakes

<u>Roadless areas of Medium value (21): (230,000 acres)</u>

- Gibson
- Temple Peak
- Right Hand Fork Logan
- Mt. Logan North
- Mt. Logan South
- Mt. Logan West
- Boulder Mountain
- Mahogany Range
- Mollens Hollow
- Swan Creek
- Sugar Pine
- Willard
- Lewis Peak
- Francis
- Farmington
- Red Butte
- Mount Aire
- Twin Peaks
- Mount Olympus
- White Pine
- Lone Peak

Roadless areas of Low value (8): (49,200 acres)

- Elk Valley
- Wellsville
- Rock Creek/Green Fork
- Burch Creek
- Hogsback
- Mueller Park
- Nobletts
- Widdop Mountain

Management Prescriptions and effects on roadless values

Management prescriptions that are applied to a roadless area are principal management direction for what practices are intended for the area. This analysis uses management prescriptions as indicators for potential effects to the roadless values identified in Appendix C. The analysis is considered from a forestwide perspective in this Chapter, and itemized for individual roadless areas in Appendix C-2.

The details of what is allowed by management prescription by alternative are presented in Chapter 2. The activity allowances considered for each prescription are: Timber Harvest, Vegetation/Fuel Treatment, Prescribed Fire, Road Building, Grazing, Wildland Fire Use, New Recreation Development, and New Trail Construction. Whether or not these activities are allowed under each management prescriptions varies based on the intent of the alternative. Allowed activities also may vary based on whether the prescription is applied in or outside an inventoried roadless area in some alternatives.

For this analysis management prescriptions are placed in one of three categories that identify different potential effects to roadless area values. These three categories are defined as:

1. **Maintains Roadless Values** – Management prescriptions that do not allow any development that might affect base physical values dependent on roadlessness (soils, watershed, vegetation). These do not allow any timber harvest, road building, mechanical fuel treatments, new trail construction, or new recreation development.

2. **Mostly Maintains Roadless Values** – Management prescriptions that allow types of development (such as new trail construction, mechanical fuels treatment, and backcountry or recreation non-motorized recreation developments) which may have short term or relatively minor effects on physical values dependent on roadlessness.

3. **Allows Development** – Management prescriptions that allow noticeable and substantial long-term changes to the physical values in roadless areas (especially soils, watershed, and appearance of vegetation). Activities in this category include timber harvest, road building, and substantial recreation developments (new campgrounds, campground expansion, major trailhead or day-use site construction).

Underlying Assumptions

Existing designated Wilderness acres (management prescriptions 1.1-1.4) are not included in this analysis of effects on roadless areas. Management prescription 8.1 is also not included in this analysis, as it is never applied in a roadless area.

Timber harvest and road building -Timber harvest and/or road building can affect roadless character. These activities can fundamentally change a roadless area because of the changes in vegetation over broad areas, and the construction process and width of roads. In Alternatives applying the Roadless Rule (1, 2, and 6) timber harvest and road building are not allowed. However, other activities such as trail construction and recreation development were not prohibited by the Rule and are allowed in various prescriptions in these alternatives that do not allow harvest and road building.

Wildland fire use, prescribed fire, grazing – These activities do not affect the basic physical values or character dependent on roadlessness. While vegetation composition, structure, and pattern may be changed from these activities, the changes are similar to those that would be expected under the dominant influence of natural processes. Substantially recognizable changes to the physical character of the roadless area are not expected from these activities.

Vegetation/fuel treatments – These activities may be viewed by some as having an affect on roadless character because of the nature of results of mechanical treatment, at least over the short term. However, these effects are expected to be much shorter term and of less magnitude than most timber harvest and/or road construction operations. Therefore, prescriptions that allow vegetation/fuel treatment but not timber harvest or road construction are placed in the “mostly maintains roadless values” category.

New trail construction - New trail construction can affect roadless character, but to a lesser extent than timber harvest or road building given the limited vegetation clearing, construction process and narrower width of trails. Prescriptions that allow new trail construction were placed in the mostly maintains roadless values category.

New recreation development - New recreation development varies somewhat in its potential effects on roadless values depending on the nature of the management prescription. Although Management Prescriptions 4.1, 4.2 and 4.3 allow new recreation development, these are not expected to have a substantial affect on roadless character. Any recreation development under these prescriptions would be tied to the intent of the prescription and relatively light on the landscape because of the lower recreation densities associated with backcountry recreation in 4.1 and 4.3 and the non-motorized aspect of 4.2. Therefore, these prescriptions were categorized as mostly maintains roadless values. Management prescriptions 4.4 and 4.5 however allow new recreation development to provide for higher user densities and motorized or developed activities. These activities are expected to have a substantial effect on roadless area values and are categorized as “allows development”.

Given these assumptions and using the management prescriptions allowed activities tables in Chapter 2 of this FEIS, Table RA-8 summarizes potential effects to roadless area values from the forest plan alternatives.

Table RA-8. Groupings of Management Prescriptions (MPCs) by Alternatives and Categories of Effects to Roadless Values

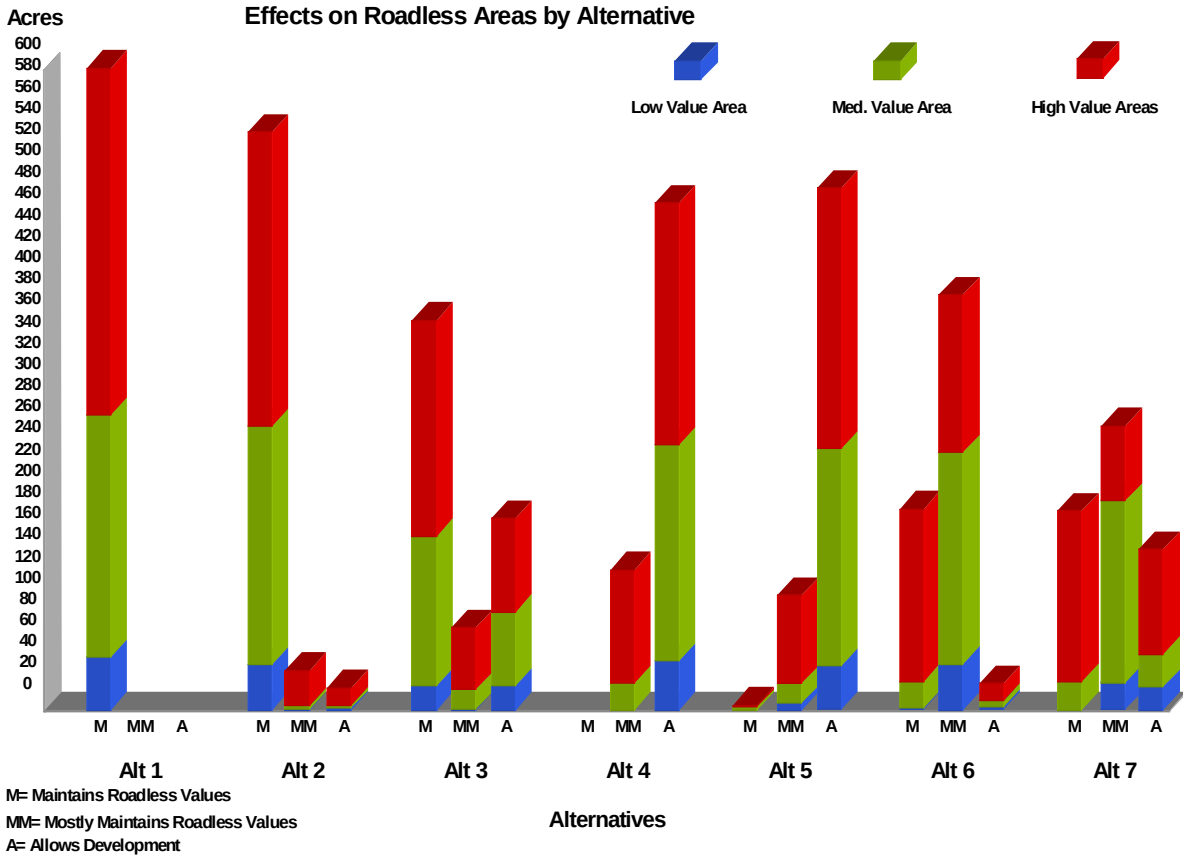
Alternative	MPCS that Maintain Roadless Values	MPCs that Mostly Maintain Roadless Values	MPCs that Allow Development
Alt 1	All MPC's	No MPC's	No MPC's
Alt 2	All other MPC's	4.1, 4.2, 4.3	4.4, 4.5
Alt 3	1.5, 2.4, 2.6, 3.1, 3.2	2.7, 4.1, 4.2	2.5, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1, 6.2, 5.1/6.1
Alt 4	No MPC's	2.4, 2.6, 2.7, 4.1, 4.2	2.5, 3.1, 3.2, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1, 6.2
Alt 5	2.4, 2.6	2.7, 4.1, 4.2	2.5, 3.1, 3.2, 4.3, 4.4, 4.5, 5.1, 5.2, 6.1, 6.2, 5.2/6.2
Alt 6	1.5, 2.4, 2.5, 2.6, 2.7	3.1, 3.2, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 5.1/6.1	4.4, 4.5
Alt 7	1.5, 2.4, 2.6	2.7, 3.1A, 3.1W, 3.2U, 4.1, 4.2	2.5, 3.2D, 4.3, 4.4, 4.5, 5.1, 5,2, 6.1, 6.2, 5.1/6.1

Table RA-9 shows the acres of high, medium and low value roadless areas whose roadless values are maintained, mostly maintained or allow development based on the prior categorization.

Table RA-9. Categories of Allowed Activities and Potential Effects on Roadless Areas

Alternatives and Areas of high, medium, and low value		Maintains Roadless Values (acres)	Mostly Maintains Roadless Values (acres)	Allows Development (acres)	Total (acres)
ALT 1	high value	326,800	0	0	326,800
	medium value	230,000	0	0	230,000
	low value	49,200	0	0	49,200
	ALT 1 Total	606,000	0	0	606,000
ALT 2	high value	276,100	35,900	14,800	326,800
	medium value	224,500	2,600	2,900	230,000
	low value	45,600	700	2,900	49,200
	ALT 2 Total	546,200	39,200	20,600	606,000
ALT 3	high value	200,800	38,100	87,900	326,800
	medium value	141,800	19,500	68,600	230,000
	low value	24,300	500	24,400	49,200
	ALT 3 Total	366,900	58,100	180,900	605,900
ALT 4	high value	0	106,100	220,600	326,700
	medium value	0	25,800	204,200	230,000
	low value	0	0	49,200	49,200
	ALT 4 Total	0	131,900	474,000	605,900
ALT 5	high value	2,000	83,400	241,300	326,800
	medium value	5,300	19,000	205,700	230,000
	low value	0	7,400	41,800	49,200
	ALT 5 Total	7,200	109,900	488,800	605,900
ALT 6	high value	165,000	143,800	18,000	326,800
	medium value	25,700	199,800	4,400	230,000
	low value	500	45,800	2,900	49,200
	ALT 6 Total	191,200	389,400	25,300	605,900
ALT 7	high value	162,000	68,900	95,900	326,800
	medium value	27,300	171,100	31,600	230,000
	low value	0	26,600	22,500	49,200
	ALT 7 Total	188,700	267,400	149,900	605,900

Figure RA-1 shows the same information as Table RA-9 in a chart.



Direct and Indirect Effects

Roadless area values that could be affected from the following activities listed below are those that are defined in Appendix C-2. Differing effects to the listed values will be dependent on the values that are present in particular area, and the nature of the activity. The following are generalized forestwide considerations, which lack site specificity, but that may help summarize the relationships between various potential actions and roadless area values.

Effects on Inventoried Roadless Area Values from Road Construction

For the 15-year period of the Forest Plan, some new road construction into roadless areas is allowed in Alternatives 3, 4, 5 and 7 that do not apply the prohibition on road construction and reconstruction as prescribed by the National Roadless Conservation Rule. No road construction and reconstruction is allowed in roadless areas in Alternatives 1, 2, and 6; the one exception is from existing oil and gas leases in the High Uintas and Lakes Roadless Areas. Road construction in any roadless area under any alternative is expected to be limited during this planning period.

Effects on Inventoried Roadless Area Values from Timber Management

Roadless area values that could be affected from timber management include potential effects from harvest and associated roads on the roadless area values defined in Appendix C-2.

Alternatives 1, 2, and 6 have the least potential timber management effects on inventoried roadless area values, because the National Roadless Area Conservation Rule generally prohibits road construction or reconstruction and the cutting, sale and removal of timber, except for removal of some generally small diameter trees which would maintain or improve roadless characteristics, TES species habitat, and maintain or restore ecosystem composition and structure. Undisturbed landscapes found in inventoried roadless areas could be altered in Alternatives 3, 4, 5 and 7 to differing degrees. Within inventoried roadless areas timber harvest could be allowed (based on prescription) on an estimated 61,000 acres in Alternative 3, 155,000 acres in Alternative 4, 158,000 acres in Alternative 5, and 63,500 acres in Alternative 7. Timber harvest activities also increase the risk to impairing water quality and affect habitat for some species. Specific guidance in the proposed forest plan however, provides protection for water resources during timber harvest operations. Effects on these inventoried roadless area values are further discussed in the watershed and biodiversity topics.

Effects on Inventoried Roadless Area Values from Vegetation/Fuels Treatment

It is unlikely that many mechanical vegetation and fuels treatments would be undertaken in inventoried roadless areas, as other roaded parts of the forest (wildland-urban interface especially) would almost always have higher priority for the limited funding available. However, within inventoried roadless areas allowances for vegetation and fuels treatments do vary by alternative. Alternative 1 does not allow vegetation and fuels treatments in inventoried roadless. In Alternative 2, vegetation and fuels treatments are allowed 460,000 acres of inventoried roadless areas (all areas not recommended for Wilderness). In Alternative 3, vegetation and fuels treatments are allowed 554,900 acres of inventoried roadless areas (all areas not recommended for Wilderness). Alternatives 4 and 5 allow vegetation and fuels treatments on all inventoried roadless. Alternative 6 allows vegetation and fuels treatments on 537,000 acres of inventoried roadless areas (all areas not recommended for Wilderness). Alternative 7 allows vegetation and fuels treatments on 423,000 acres of inventoried roadless areas (all areas not recommended for Wilderness and in MPC 2.6).

Effects on Inventoried Roadless Area Values from Fire Management

The fire management category includes prescribed fire, wildland fire use, and fire suppression. All three fire management activities are allowed in inventoried roadless areas, with the exception of Alternative 1, in which prescribed fire is not allowed. Prescribed fire and wildland fire use ought to have no effect in any alternative to inventoried roadless values. Planning for these activities would need to take into account the nature of the values in any particular area. The use of some fire suppression actions could be limited by the roadless nature of these areas. If fire suppression actions required ground-disturbing activities to build road or fireline, effects to

roadless values could occur. Construction of fireline or other ground disturbing activities can usually be mitigated in post fire operations.

Effects on Inventoried Roadless Area Values from Recreation Management

Inventoried roadless area values that could be affected from recreation management include semi-primitive non-motorized and semi-primitive motorized settings for undeveloped recreation activities, clean drinking water, and wildlife habitat.

Recreation management could affect roadless areas if new facilities and new roads are built and left open for recreation access in roadless areas. Recreation management could also affect roadless area characteristics if recreation use was managed to such densities that semi-primitive character was lost, or if recreation was improperly managed to the degree water quality was impaired.

In Alternative 1 with motorized and mechanized recreation restricted in about 360,000 acres that are recommended as wilderness, user densities could increase in the remaining inventoried roadless areas; however, it is unlikely that user densities would increase to the degree that semi-primitive settings are compromised. Effects from recreation management in Alternatives 2,3,6, and 7 would be similar to that described for Alternative 1, in that displacement from recommended wilderness could occur to areas where more motorized uses are allowed. Alternatives 4 and 5 allow some new recreation facilities or road construction in inventoried roadless areas that may affect their semi-primitive character, however, it is unlikely that forest budgets would be sufficient to allow much development, particularly in inventoried roadless. Standards and guidelines that are common to all alternatives for water quality and properly managed recreation will reduce the risk of impaired water quality.

Effects on Inventoried Roadless Area Values from Recreation Use

Recreation Opportunity Spectrum – The following discussion refers to Table RA-10 that shows the forestwide allocations to ROS categories in inventoried roadless areas. The 1985 Forest Plan mapped ROS and winter recreation for the Wasatch-Cache; these mappings were never fully implemented as management direction. Acreage totals for current on the ground recreation settings and experiences in roadless areas are shown in the Existing Conditions column in Table RA-10. This is presented so the reader can make a comparison to the current setting, which is managed under current Travel Management Plans. In the ROS table below only non-snow conditions are accounted for; considerations for winter recreation are presented later. Across the range of alternatives inventoried roadless areas include allocations to all Recreation Opportunity Spectrum categories except Urban.

Allocations of acreage to non-motorized recreation (only the Semi-Primitive Non-Motorized category) are highest in Alternative 1, and next highest in Alternative 2. Alternative 5 provides the least acreage to this category. Alternatives 6, 7, and the Existing Condition are about equal. Alternative 3 falls between the extremes of the other alternatives.

The existing condition in roadless areas for motorized recreation provides 239,100 acres within motorized recreation ROS categories (the sum of Rural, Roaded-Natural, and Semi-Primitive Motorized); Alternative 7 provides the same amount. Alternative 5 has the most acreage in motorized ROS categories for inventoried roadless areas – 325,400, and Alternative 1 has the least – 112,900. Alternative 2 has 221,800 acres; Alternative 3 has 254,900 acres; Alternative has 364,900 acres; and Alternative 6 has 241,100 acres.

Summer motorized use is restricted to designated Forest system roads and motorized trails. While the acreage allocations shown in the ROS tables might seem to indicate that large areas are for available motorized use, in fact the area actually available for use is considerably smaller and limited to appropriate routes. ROS for motorized categories shows areas where the influence (sights, sounds) of motorized use may be expected by a forest visitor.

Table RA–10. Recreation Opportunity Spectrum allocation in Roadless Areas

Recreation Opportunity Spectrum	1	2	3	4/1985 Forest Plan	5	6	7	EC
NA*	0	0	0	31,220	0	0	0	0
Urban**	0	0	0	0	0	0	0	0
Rural	6,500	6,400	8,400	2,200	10,400	6,800	0	0
Roaded Natural	50,800	106,700	113,100	294,100	135,000	114,300	96,200	96,200
Semi-Primitive Motorized	55,600	108,700	133,400	68,600	180,000	120,000	142,900	142,900
Semi Primitive Non-Motorized	492,900	384,000	350,900	209,800	280,200	365,500	366,800	366,800

EC = Existing Condition - On the ground, current situation as managed by current Travel Plans.
**NA – This acreage represents newly acquired lands since 1985 for which there was not management direction in the 1985 Forest Plan.*
*** Less than 100 acres of Urban category ROS were mapped forestwide.*

Winter Recreation - Motorized winter recreation use may negatively affect roadless values and recreation experiences for non-motorized winter users by introducing the sounds and presence of snowmobiles into a roadless area. Conversely, snowmobile enthusiasts often feel that their opportunities and experiences are constrained when acreage available for snowmobile use is reduced. Table RA-11 shows the acres and percentage of inventoried roadless areas available to snowmobiling (and by interpretation, those that are not available). Aside from the Winter Recreation setting mapped in the 1985 Forest Plan, Alternative 5 provides the most acreage in inventoried roadless for snowmobile use; Alternative 1 provides the fewest acres open to snowmobiling. The other alternatives fall in between these extremes.

One aspect of winter motorized recreation use, heliski operations, can affect non-motorized winter backcountry users in Alternatives 3, 4, 5, 6 and 7. These users would be affected to the same extent in Alternatives 4-7, and on different and fewer acres in Alternative 3 (See Winter Recreation maps for where the helicopter allocations occur within inventoried roadless areas on

the Wasatch Front.) Detailed information about where heliski operations are allowed within individual inventoried roadless areas can be found in Appendix C-2. Alternatives 1 and 2 that do not allow heliski opportunities would not affect these users. Heliski users and operators would be affected depending on whether an alternative allowed or did not allow the heliski opportunity on the Forest.

Table RA-11. Acres in Inventoried Roadless Areas Open to Snowmobiling and Heliskiing

	1	2	3	4/1985 Forest Plan	5	6	7	EC
Acres Open to Snowmobiling	20,000	63,000	372,000	442,000	437,000	310,000	305,100	396,100
Percent Open to Snowmobiling	3%	10%	61%	73%	72%	51%	50%	65%
Acres of Open to Heliski	0	0	12,000	17,000	17,000	17,000	17,000	17,000

EC = Existing Condition - On the ground, current situation as managed by current Travel Plans.

Effects on Inventoried Roadless Area Values from Oil and Gas Activities

The following description of effects refers only to the area identified as the "Appeal Settlement Zone" as described in Topic 9 – Oil and Gas. It is estimated to be 68,300 acres.

Since the Appeal Settlement Zone is coincident with much of the High Uintas Roadless Area, any development predicted in the ASZ would affect roadless values as stated below. Oil and gas activities and associated roads have potential impacts to roadless values. Oil and gas leasing varies by alternative. Refer to the description below for the differences in leasing by alternative. In areas that allow surface occupancy, roads would be constructed to access well pads. If the roads were made available to public travel, opportunities for motorized recreation would increase. Depending on the location of the development, some parts of the inventoried roadless area could be fragmented and isolated, reducing their ability to offer privacy and seclusion. Within the context of the appeal settlement zone, biological diversity would only be affected on a site specific scale. The risk of affecting water sources from oil and gas activities depends on the acres potentially disturbed and stipulations applied. The risk is more thoroughly described in Topic 1 – Watershed Health.

Though Alternative 1 does not allow new leasing in the Appeal Settlement Zone, development of existing leases within the Table Top Unit could affect roadless values on an estimated 20 acres. In areas outside of the Table Top Unit that are not currently leased there would be no effects.

Alternative 2 is very similar to Alternative 1. Again, development of existing leases within the Table Top Unit could affect roadless values on about 20 acres. Once existing leases expire, leasing availability in areas recommended for wilderness is precluded. On remaining available acres, new leases could be issued but surface occupancy would not be allowed.

Alternatives 1 and 2 offer the greatest protection of roadless values.

Alternative 3 precludes leasing on 18,200 acres recommended for wilderness and does not allow new leases with surface occupancy on 37,200 acres primarily managed for undeveloped (Prescription 2.6) and backcountry recreation (Prescription 4.1 and 4.2) values and terrestrial habitat (Prescription 3.2). New leases could be issued on about 2,500 acres with stipulations applied to protect sensitive resources. An estimated 10,400 acres are available under Standard Lease Terms. Of the 12,900 acres that allow surface occupancy, oil and gas activities are estimated to disturb about 75 acres. Some of this development is predicted on existing leases within the Table Top Unit. Roadless values most likely to be affected include non motorized recreation and the privacy and seclusion offered by an undisturbed landscape. These roadless values could be affected for 20-30 years because of field development.

Alternative 4 does not make a leasing decision. Because lessees would not be able to effectively develop a field should one be discovered due to nearby unleased parcels, future activities are not likely. No effects to roadless values are probable.

Alternative 5 would provide for leasing with standard lease terms and therefore provide the greatest opportunity for full field development. Oil and gas activities are estimated to affect about 105 acres. Some of the effects could last 20-30 years because of field development. Mitigation measures could be required as conditions of approval to protect individual values.

In Alternative 6, leasing availability is precluded on 20,000 acres recommended for wilderness. New leases issued as a result of the leasing decision made in the plan revision would not allow surface occupancy. However, existing leases in the Table Top Unit that expire would be immediately renewed in areas not precluded by management plan direction. Leases would be renewed on the 3,600 acres managed for motorized recreation values and terrestrial habitat. Of this acreage, oil and gas activities are estimated to disturb about 75 acres. Some of this development is predicted on existing leases within the Table Top Unit. Roadless values could be affected for 20-30 years should a field be discovered. In the remainder of the area the effects to roadless values would be minimal because of no surface occupancy. Because of the low percentage of lands that allow surface occupancy, large undisturbed landscapes are more likely to remain intact.

Alternative 7 would preclude leasing on 20,400 acres recommended for wilderness. On the remaining 47,900 acres available for leasing, surface occupancy would be allowed on 27,000 acres. Of this acreage, oil and gas activities are estimated to disturb about 85 acres. Roadless values could be affected 20-30 years should a field be discovered. Some development (included in the 85 acre estimate) is predicted within the Table Top Unit because of existing leases and new leases being offered with surface occupancy.

Effects on Inventoried Roadless Area Values from Mineral and Land Ownership

Under any alternative, in roadless areas where there is non-federal mineral or land ownership, the ability to explore, make claims, and occupy lands for minerals (provided under the 1872 Mining

Act) and rights of access to private lands could compromise the values which have been identified for roadless areas (See Appendix C-2).

In roadless areas on the Wasatch-Cache private ownership of minerals occurs on 66,811 acres where there is federal surface ownership (Table RA-12). Most of these private mineral ownership situations occur along the Wasatch Front where few of the areas are recommended for Wilderness, except in Alternative 1. There is also substantial private minerals ownership in Upper South Fork and High Uintas roadless areas whose roadless values could be affected if development occurred under any alternative. Application of the non-development MPC 2.6 could create conflicts with management intent in Alternatives 1, 2, or 7 where that allocation is relatively common in the areas listed below.

Table RA-12. Non-federal ownership of minerals in roadless areas

Roadless Area	Acres
Mt. Logan North	1046
Mt. Logan South	252
Mollens Hollow	761
Wellsville	15
Sugar Pine	61
Upper South Fork	8400
Willard	11759
Lewis Peak	8647
Burch Creek	4404
Francis	10052
Farmington	6059
Hogsback	3877
Mueller Park	3511
Mt. Olympus	374
Twin Peaks	344
Lone Peak Additions	319
Nobletts	106
Lakes	460
High Uintas	6364
TOTAL	**66811**

The current status for non-federal land ownership is provided in Table RA-2. Private and State Inholdings within Inventoried Roadless Areas. The table shows that most inventoried roadless areas along the Wasatch Front have from 40 to a few hundred acres in non-federal ownership to which developed access by owners might be desirable, and which could be affected at any time. In Alternatives 1, 2, and 6 where the Roadless Areas Conservation Rule has been applied, roadless areas are to be protected from road construction, but access to private inholdings is an exception to that direction. Placing these roadless areas into management prescriptions where new road or other construction is not intended (1.5, 2.4, 2.6) might create administrative processes in Alternatives where that is the case, adding to management costs and possible controversy.

Topic 5 – Wilderness Characteristics, Roadless Area Values, and Wilderness Management

Wilderness Management

Introduction

There are seven existing wilderness areas on the Wasatch – Cache National Forest totaling 309,079 acres. This represents approximately 25 percent of Wasatch – Cache National Forest Service acreage and 38 percent of all the current wilderness areas in Utah State. The wilderness areas on the Forest are Lone Peak, Twin Peaks, Mount Olympus, Deseret Peak, Wellsville Mountains, Mount Naomi, and High Uintas. Lone Peak is shared with the Uinta National Forest and the High Uintas is shared with the Ashley National Forest.

Laws, Policy, and Direction

- **The Wilderness Act (1964) -** Established a National Wilderness Preservation System to be administered in such a manner as to leave these areas unimpaired for future use and enjoyment as wilderness.

- **The Alaska National Interest Lands Conservation Act (1980) -** Directs the Secretary of Agriculture to provide adequate access to non-federal land within the boundaries of the National Forest System including congressionally designated areas.

- **Congressional Grazing Guidelines (Sec. 108, PL 96-560, H.R. Report 96-617 dated 11/14/79) -** Clarify the Congressional intent that livestock grazing will be permitted to continue in national forest wilderness areas, when such grazing was established prior to classification of an area as Wilderness. This policy is reiterated in FSM 2323.22.

- **Endangered American Wilderness Act of 1978 (PL 95-237):** Includes the designation of Lone Peak as a wilderness area and some watershed protection requirements for that area.

- **Utah Wilderness Act of 1984 (PL 98-428):** Includes the designation of High Uintas, Mount Naomi, Wellsville Mountains, Mount Olympus, Twin Peaks and Deseret Peak as wilderness areas and some requirements for grazing in wilderness, state water allocation authority, prohibition on buffer zones, and mineral resources.

Affected Environment

Lone Peak became a Wilderness in 1978 with the Endangered American Wilderness Act and the other six areas became Wilderness in 1984 with the Utah Wilderness Act of 1984.

Table WM-1
Wilderness by District and Acreage

Name	District	WCNF Wilderness Acres	Total Wilderness Acres
Twin Peaks	Salt Lake	11,495	Same
Mount Olympus	Salt Lake	15,300	Same
Lone Peak	Salt Lake	9,747	30,578
Deseret Peak	Salt Lake	25,215	Same
Mount Naomi	Logan	44,523	Same
Wellsville Mountains	Logan	22,986	Same
High Uintas	Kamas, Evanston, Mt View	179,813	453,664

The long-term goal is to maintain wilderness, where ecosystems are primarily influenced by the forces of nature, provide a diversity of opportunities for public use, enjoyment and understanding of wilderness, and preserve a high quality wilderness resource for present and future generations. The Wilderness Act of 1964 emphasizes the protection of pristine areas and recognized recreational values of public benefit. Wilderness provides outstanding opportunities for solitude and for primitive and unconfined recreational experiences. Since the Wilderness Act became law in 1964, millions of people have visited designated Wilderness for solitude, recreation, spiritual enhancement, and natural appreciation. Recreation is just one way that wilderness resources are used and valued. Wilderness is important as a sanctuary for undisturbed ecosystems, for maintenance of species diversity, protection of threatened and endangered species, as well as non-endangered plants and animals, protection of watersheds and clean water, protection of airsheds and clean air, scientific research, and various social values. Wilderness is a benchmark for determining our nations environmental and spiritual health. Local communities receive some economic benefits from wilderness designation through tourism and recreation.

The act defines the statutory definition of wilderness as:

> "A Wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of Wilderness is further defined to mean in this Act, an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements of human habitation, which is protected and managed so as to preserve its natural conditions and which:
> 1. Generally appear to have been effected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
> 2. Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
> 3. Has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
> 4. May also contain ecological, geological, or features of scientific, educational, or historic value."

Wilderness designation allows uses specified in the 1964 Wilderness Act and the exceptions directed by the Utah Wilderness Act of 1984.

Wilderness acreage varies in the seven management areas on the Forest. The Eastern Uintas followed by the Stansbury and Central Wasatch management areas have the highest percentage of wilderness acreage, while the North Wasatch – Ogden Valley and Bear management areas have the no wilderness acreage.

Table WM-2
Existing Wilderness Acreage and Percentage

Management Area	Acreage of Existing Wilderness	Percent of Management Area designated Wilderness
Central Wasatch	36,542	37
North Wasatch – Ogden Valley	0	0
Stansbury	25,214	37
Cache – Box Elder	67,509	23
Bear	0	0
Western Uintas	42,846	15
Eastern Uintas	134,966	44

Wilderness areas on the Forest include:

Mount Naomi

Located on the Logan Ranger District and part of the Cache – Box Elder management area with elevations up to 9,980 feet on Naomi Peak. Use is a collection of day visitors, backpackers and horseback riders, while the winter receives cross-country ski and snowshoe users. Key access is off the Logan Canyon Highway, along the Logan front and reaching the high country is popular from the Tony Grove Lake area. Included in the area is the Mount Naomi Peak National Recreation Trail. Use varies from low to high, depending on location and season. The area has important wildlife and ecosystem values.

Wellsville Mountains

Located on the Logan Ranger District and part of the Cache – Box Elder management area with elevations up to 9,372 feet on Box Elder Peak. Almost all of the Wellsville Mountains are part of the wilderness, but the trail system and access is limited. The area is known also for its raptor migrations. Use varies, but is generally on the lower side.

High Uintas

Located on the Kamas, Evanston and Mountain View Districts, but much of it is on the Ashley National Forest, who shares in management of the area (Wasatch-Cache has 179,813 acres of 453,664 total acres). The High Uintas is on both the Western and Eastern management areas. It is the largest wilderness area in the state with elevations up to 13,528 feet on Kings Peak, the highest mountain in the state. Terrain varies from vast lodgepole forests, to river canyons to high alpine meadow and rock country. Use varies from low to

high depending on location and season, but the area is extremely popular and well known throughout the state and nation. The High Uintas attracts a high volume of backpackers and horseback riders. Hiking is popular from access off of Mirror Lake Highway and the Forest Service North Slope road. The area is popular for visits by groups and organizations such as Boy Scouts, church groups and hiking clubs. Winter access is somewhat limited, but the winter recreation visitation is increasing. The High Uintas is known for its outstanding scenery, ecosystem and wildlife values. The High Uintas Wilderness area has a management plan for the area completed in 1997.

Deseret Peak

Located on the Salt Lake District and on the Stansbury management area in the Stansbury Mountains near the Tooele area. It is a desert mountain island in the Great Basin with elevations up to 11,031 feet on Deseret Peak. Use in the past has been low, but is now increasing because of growth in the Tooele area and crowded conditions in the Wasatch Front wilderness areas. Use is a combination of day hikers and backpackers with some horseback riding. The area is also known for its ecosystem and wildlife values.

Mount Olympus, Twin Peaks, and Lone Peak

These three wilderness areas are located on the Salt Lake Ranger District and on the Central Wasatch management area adjacent to the Salt Lake metropolitan area. Lone Peak is also located on the Uinta National Forest, that shares in its management (Wasatch-Cache has 9,747 acres of 30,578 total acres. Use is extremely high all yearlong, including the winter. Some solitude can be found in the off-trail and more rugged sections. These Wasatch front wilderness areas are somewhat unique as wilderness, in that 90 percent plus of their use is from day visitors to the area. Backpacking opportunities are somewhat limited. Horseback riding and dogs are limited to the Mill Creek side of Mount Olympus, because of important watershed values. Access is very easy with a lot of trailheads and access points from Mill Creek Canyon, Little Cottonwood Canyon, Big Cottonwood Canyon and along the Wasatch front. Elevation high points are 10,246 feet Gobblers Knob (Mount Olympus), 11,330 foot Twin Peak (Twin Peaks), and 11,326 foot Little Matterhorn Peak (Lone Peak). The area offers critical wildlife habitat, because of its adjacency to urban development. These areas are critical watershed for the Salt Lake area.

Biological Diversity of Wilderness

Air quality – Wilderness areas on the Wasatch-Cache are rated as Class II areas. Visibility in long distance views is often a problem in the Wasatch front wilderness areas, because of their adjacency next to the Salt Lake metropolitan area.

Water Quality – Wilderness areas on the Wasatch-Cache are important critical watersheds for communities and wildlife needs. Most of the three Wasatch front wilderness areas are watersheds for Salt Lake City, while other wilderness areas are important watersheds for other local communities.

Vegetation – Much of the wilderness acreage on the Forest is higher elevation, but it can vary from around 5,000 feet to over 13,000 feet thus supporting a diversity of vegetation types including grass/forbs, brush types, conifer, aspen and alpine.

Livestock Grazing – There is no grazing in the three Wasatch front wilderness areas (Mount Olympus, Twin Peaks and Lone Peak). The other four wilderness areas (Mount Naomi, Wellsville Mountains, Deseret Peak, High Uintas) have some cattle and sheep allotments. Some of the allotments in the High Uintas Wilderness are vacant or closed.

Table WA-3
Grazing Allotments in Wilderness Areas

Wilderness	Number of Allotments
High Uintas	19
Mount Naomi	3
Wellsville Mountains	3
Deseret Peak	5

Wildlife and Fisheries – The wilderness areas provide relatively undisturbed habitats for wildlife including several species at risk. Much of the area is summer range, but the lower slopes offer some critical remaining winter range. Big game includes deer, elk, and moose. Mountain Goats have been introduced. Bighorn sheep inhabit the Hole-in-Rock/Hoop Lake area near the High Uintas. Predators include coyote, bobcat, cougar, and black bear. Many non-game, small game and bird species utilize and live in wilderness areas, as well as reptiles and amphibians. Hunting and fishing opportunities, as well as wildlife watching are popular in wilderness areas. Native trout exist in wilderness. The Utah Division of Wildlife Resources has historically stocked many lakes and streams with trout. Possibly some wilderness areas could offer potential habitat for rare species including large predators.

Fire – Within the wilderness areas in the past, primary management action for fires has been suppression, which has led to vegetation conditions that differ from those resulting from natural processes. It is now recognized that fire benefits ecological and habitat values. Fuel buildups are high in many areas, increasing the potential of severe fires next to developed areas and creating suppression needs to protect private property and watershed values. Currently, only the High Uintas has a wildland fire use plan. The Wasatch-Cache does not have any fire plans for our portion of the Lone Peak Wilderness; prescribed burns are not allowed by the current Forest plan on the Wasatch-Cache side. The Uinta National Forest does have a wildland fire use plan on its portion of Lone Peak. The goal of wildland fire use in wilderness is to allow natural disturbances to play their natural role in the ecosystem cycles within the wilderness.

Insects and Disease – Snags and stands of dead trees remain from various insects and disease epidemic attacks in the past. These have included mountain pine beetles in the lodgepole stands in the High Uintas and mistletoe and outbreaks in small stands along the Wasatch Front wilderness areas. Because natural processes are allowed to function in wilderness, no management actions are underway or planned.

Undesired Species – Noxious weeds in wilderness areas including Dyers woad, leafy spurge, and Canada thistle is an increasing problem and starting to spread to new areas. The Mount Naomi Wilderness area especially has had noxious weed invasions. Certified weed-free feed is required in national forest to prevent additional infestations from stock feed.

Recreation Use in Wilderness Areas

Recreation use in wilderness is increasing and can affect wilderness values and resources, naturalness, wildness, and solitude. Without proper management, the quality and values of wilderness are jeopardized.

A primary concern is the growing increased use of wilderness visitors impacting both popular sites, as well as pristine areas. One tool to help manage this is the use of opportunity classes based on limits of acceptable change. Currently, only the High Uintas Wilderness has approved opportunity classes. For the High Uintas Wilderness area approximately 33% of the area is Class I, 58% is Class II, and 9% is Class III. Other wilderness areas will have Class I, II, and III areas designated in this plan revision.

Wilderness visitation use is considered high on the Wasatch-Cache, except for perhaps the Deseret Peak and Wellsville Mountain areas, that have lower use. Popular trails and destinations are often crowded with demand for wilderness often exceeding supply. High use is especially occurring in areas such as:

- Near urban areas, such as the three Wasatch front wilderness areas.
- Trail corridors convenient for day hikes
- Lake basins
- Destination areas and trails to high peaks (example Kings Peak in High Uintas, Highline Trail, Mount Naomi Peak National Recreation Trail).
- Easy access areas – paved or graded gravel roads, trailheads with ample parking.

Types of recreation use vary by wilderness area, terrain, season and access. The trend is for continued increased use, especially in wilderness areas located near urban areas. Day hiking dominates the three Wasatch front wilderness areas. The highest backpacking and horse use is in the High Uintas Wilderness. Many areas receive high recreation use all year long. Much of the current management emphasis is to manage areas of heavy impact, try to confine use to these corridors and areas and to protect the more pristine wilderness values.

Commercial services can be performed within approved wilderness areas to support activities essential to realizing the recreational and other values of the area (Wilderness Act of 1964). Commercial outfitting and guiding services currently in wilderness are conducted only in the High Uintas Wilderness area with one outfitter out of the Mountain View District.

Currently, none of the wilderness areas have a required visitor use permit system or designated camp areas. There are recommended campsites in some areas. Permit systems may eventually be a part of future wilderness management.

Motorized equipment can be authorized on a case-by-case basis in wilderness, where there is a legitimate emergency involving human health and safety, such as a rescue mission for injured or lost people or for critical fire suppression needs. Other exceptions in the Utah Wilderness Act of 1984 allow access to service sanitation facilities, access to municipal water developments, and access to meteorological facilities.

There are some problems of motorized recreation trespass into the wilderness, such as snowmobiles in the High Uintas, Mount Naomi, and Wellsville Mountain areas and OHV summer season trespass in Deseret Peak area. Mountain bike use (classified as mechanical use not allowed by the 1964 Wilderness Act) is a trespass problem in some wilderness areas. Although it is an escalating problem, the trespass in wilderness from motorized and mechanical use generally is from a limited number of users.

Special Designations in Wilderness

There are no designated Wild and Scenic Rivers on the Forest, but there are eligible segments of rivers in the Wild and Scenic River inventory for the Forest within wilderness. Suitability analysis for these segments is not being conducted as a part of Forest plan revision. There are no registered National Historic sites within wilderness, but there are some sites that are eligible for the National Register of Historic Places. The Mount Naomi Wilderness has the Mount Naomi Peak National Recreation Trail.

Future Trends

There continues to be public interest in adding land to the National Wilderness Preservation System, either as additions to existing wilderness or as new wilderness areas. If lands are added to the system, they will satisfy both a need for preserving natural ecological conditions and for public recreation in primitive and pristine environments.

There is also opposition to adding to the wilderness system, with views that these areas are needed for access, motorized recreation needs such as snowmobiling and motorized recreation, and for future commodity outputs that benefit local community economies.

Regardless of the acreage of wilderness, use in these areas will continue to increase as a result of population growth, the desire to visit areas with pristine values, and the popularity of outdoor recreation. New technologies are continuing to be developed, that may alter the primitive recreation experience. For example cellular phones and GPS units are changing the sense of challenge, adventure, and solitude. Given the reliance on these devices and urbanization of the population, primitive skills of some visitors could diminish.

The availability of lands outside wilderness that are capable of providing high quality, primitive, wild land recreation experiences has decreased over time. If use in the most pristine portions of wilderness areas increases, these unique parts of wilderness, that offer outstanding opportunities for solitude and are virtually unaffected by use, are at risk. Low use pristine locations are highly vulnerable to being adversely impacted by even small increases in use.

Management of wilderness areas is changing. More areas are incorporating permit systems, designated sites and use restrictions. Another management tool is that of the minimum tool concept, where wilderness managers scrutinize planned actions to determine if they are necessary to protect wilderness resources or experiences. If the action is deemed necessary, then it must be accomplished with the least impact on wilderness values.

Finally, we are seeing a shift in the view of wilderness values. For a long time, wildernesses were looked at primarily as areas to meet primitive recreation needs, however they are now being recognized as critical areas for ecosystem, wildlife and watershed values, as well as for education and research.

In August of 2000, The Forest Service finalized the National Wilderness Agenda known as "Thinking Like a Mountain". The purpose of the Wilderness Agenda is to provide a platform for communicating the values of wilderness and to focus energies on effective implementation strategies that will maintain and manage these limited resources. The Forest Service vision for wilderness areas is that wilderness is protected, nurtured, and sustained by increasingly competent and committed managers, supported by expanded scientific knowledge and growing political strength from a public that increasingly understands and appreciates wilderness.

In the Forest Service's Wilderness Recreation Strategy, two primary problems were identified: 1) Many users are critical of use limits based on social standards alone, in high destination areas, and 2) When use limits are implemented in high use areas, visitors are displaced to the more pristine and sensitive areas that have received low use in the past. Selected courses of actions to respond to these problems included: 1) Create and/or market opportunities for high quality wildland recreation experiences outside wilderness and off National Forest lands; 2) Make it a priority to commit resources and protection to low use wilderness lands to ensure non-degradation of their outstanding opportunities for solitude and near pristine conditions; and 3) Manage high use destinations as sources of inspiration and connection with wilderness, develop and implement social standards with public input, and implement management actions to ensure that impacts to physical and biological resources are contained within standards established in the Forest plan.

Environmental Consequences

General Effects

Human use of designated wilderness is governed by the terms in the Wilderness Act. This limits management activities within the wilderness. Wilderness is managed to limit human impacts and influences to desired levels. Project proposals within these areas are evaluated for compliance with wilderness values. Commercial uses of wilderness are controlled by special use permits and associated operation plans. Because direction for wilderness is detailed in law, regulation, agency policy and in specific management plans, wilderness management for existing wilderness will vary little by alternative.

Effects on wilderness from Wild and Scenic Rivers

The proposed forest plan provides standards to protect the essentially free-flowing character and outstandingly remarkable values of all eligible segments. These standards apply for the length of the segment and for .25 miles from the banks on both sides of the segment. Rivers found eligible within wilderness areas would be protected as wild rivers. Approximately 81 of the 88 miles of eligible wild and scenic river segments in wilderness are in the High Uintas Wilderness. Current wilderness areas have the following eligible wild and scenic river segments:

Table WM-4. Wild and Scenic River Eligible Segments in Wilderness Areas

Wilderness Area	Wild and Scenic River Eligible Segments	Miles
High Uintas	Henrys Fork	8.0
High Uintas	Thompson Creek	3.7
High Uintas	West Fork Beaver	4.6
High Uintas	East Fork Blacks Fork	15.4
High Uintas	East Fork Smiths Fork	11.0
High Uintas	LH & RH Fork Bear River	9.4
High Uintas	Middle Fork Beaver Creek	6.9
High Uintas	Ostler Fork	3.7
High Uintas	Stillwater Fork	6.1
High Uintas	West Fork Blacks Fork	8.1
High Uintas	West Fork Smiths Fork	3.8
Mount Naomi	High Creek	5.7
Lone Peak	Little Cottonwood (boundary)	1.1

Wild and Scenic River management is compatible with wilderness and would have no effect on wilderness.

Effects on wilderness from vegetation and fire management

Management activities in wilderness are limited. In fact, the forces of nature (fire, insects, and disease) should be allowed to play a natural role in wilderness without intervention, as long as they do not threaten resources, public safety, and properties outside the wilderness boundary. Present conditions reflect years of fire suppression, but vary depending upon location. One of the most significant impacts to wilderness has been the suppression of fire. The exclusion of fire has produced vegetative conditions that are outside of the historical range of variability. Two vegetation management tools available inside wilderness are wildland fire use and prescribed fire. To help improve ecosystem health and meet the intent of the Wilderness Act, the proposed Forest Plan provides direction for wildland fire use within designated wilderness. This direction would apply to alternatives 1, 2, 3, 5, 6 and 7. Since Alternative 4 is the 1985 Plan as amended, use of wildland fire would not be allowed except where fire use plans are in place (High Uintas Wilderness). Prescribed fire would be allowed only to meet wilderness objectives in Alternatives 2, 3, 5, 6 and 7.

Potential direct effects of wildland fire and prescribed fire could include a temporary loss of vegetation, reduction in water quality due to sedimentation, loss of cultural resources, temporary loss of grazing opportunities, smoke pollution, and a perceived loss in scenic quality. Indirect

effects of fire use may include a temporary loss of wildlife habitat for some species, or additional habitat for others. Fires burning in wilderness could change use patterns and cause inconvenience for visitors. Wilderness users could expect temporary access restrictions during periods of fire use activities. Recreational use of burned-over areas may drop for a period of years, until vegetative recovery achieves a more advanced stage. Lethal fire in heavy timber stands could increase long-term trail maintenance needs from continued downfall of snags across trails.

Timber harvest is not permitted within wilderness areas, but logging activities near wilderness boundaries have the potential to create short-term noise level increases that change the user's perception of being in a remote area. Vegetation management activities near the wilderness boundary have the potential to affect wilderness use levels by creating potential motorized trespass entry points and increasing the potential for ecosystem effects such as noxious weed introductions. Additional access as a result of vegetation management activities may result in increased non-motorized recreation use. Alternatives 2, 3, 4, 5, 6 and 7 allow timber harvesting. It is possible some timber harvests could be located near wilderness boundaries. Mechanical treatments in oakbrush could also have some short-term effects near wilderness boundaries on the Wasatch Front.

Effects on wilderness from roads management

Construction and reconstruction of roads near wilderness boundaries can potentially affect wilderness resources by increasing access. Road building activities near wilderness boundaries have the potential, in some types of terrain and vegetative cover, to increase inappropriate wilderness use by creating potential motorized entry points. In the short term, increased noise levels change the user's perception of being in a remote area. Improved access could also result in increased recreation use.

Due to Roadless Area Conservation Rule being applied in alternatives 1, 2, and 6, the potential for effects resulting from road construction would lowest in these alternatives.

Effects on wilderness from wildlife and fisheries management

The Utah Division of Wildlife Resources through state game management regulations accomplishes much of the general management of wildlife including hunting seasons and fish stocking of lakes. The Forest Service manual (FSM 2641) provides that the state has the responsibility to make determinations about which wildlife and fish species are native or indigenous. The Forest Service has the responsibility to prevent damage to resources occurring on National Forest system lands. Monitoring of range conditions, management indicators and species at risk will help in meeting that responsibility.

It is recognized that fish stocking can cause human use around lakes and that stocking can interfere with historic aquatic natural processes. Holden (et al 1996) recognized that impacts to historic aquatic natural processes have occurred due to stocking fish in previously fishless waters. Historic aquatic natural processes (prior to human induced change) in currently or historically stocked waters, will be difficult, if not impossible, to fully restore. It is likely that if stocking is precluded, amphibians will migrate back into lakes, macroinvertebrate communities

are likely to recolonize, but zooplankton and other invertebrate species may not. However, zooplankton and other invertebrates can be reintroduced with human intervention.

Wilderness fishing recreation use is high in some areas causing increased use and associated impacts in popular lake basins.

Effects on wilderness from recreation management

Use in existing wilderness is expected to increase regardless of alternative. Corresponding increases in recreation-associated impacts to wilderness resources can also be expected. Additional areas recommended as wilderness could redistribute some of this use. In some cases the use in relatively undisturbed areas could increase as a result of wilderness designation. Alternatives 1 and 2 have the most opportunity for additional areas to provide wilderness experiences.

Wilderness education will be emphasized in all alternatives in an effort to protect wilderness values. The emphasis of each alternative may affect the amount of budget available for the wilderness education program. In all alternatives information and education, management, and regulation enforcement are expected to protect wilderness values. Additional management could include strategies such as permit systems, group size limits, camping restrictions, and designated campsites.

Effects on wilderness from livestock grazing

Grazing would continue in wilderness in accordance with Congressional guidelines and management direction in the proposed forest plan. Improvement of conditions identified as not meeting objectives varies by alternative and would affect wilderness as described in the section on effects on vegetation from livestock grazing (Topic 2). Because the Wilderness Act of 1964 permits grazing within wilderness, disposition of vacant allotments by alternative is based on other resource needs, not on wilderness considerations.

Effects on wilderness from mineral and energy exploration/development

Designated wilderness is withdrawn from energy leasing and mineral entry, subject to existing rights. Private minerals within wilderness could be developed. There would be no difference between the alternatives in effects from mineral or energy exploration or development on designated wilderness areas.

Effects on wilderness from land ownership

Generally landownership adjustments within designated wilderness are made in order to acquire private and state inholdings. These are usually done to protect or maintain wilderness values from the threat of development resulting in long-term benefits for wilderness resources. There would be no difference between alternatives in effects on wilderness areas.

Cumulative Effects

Wilderness values and uses both increase as population and development of private lands continues. The last legislation to designate wilderness in the state of Utah was in 1984 just prior to completion of the 1985 Forest Plan. Wilderness designation is and has been an issue of high interest in the state. Large areas of potential wilderness occur on lands managed by the Bureau of Land Management in Utah. These areas have recently undergone an inventory update adding substantial acreages to wilderness study areas. However numerous attempts to reach compromise on legislation for wilderness designation have been made without success. The future of wilderness for these lands in the state of Utah is an unknown and until they are decided, national forest wildernesses are the primary contributors to the National Wilderness Preservation System for this region.

The degree to which fire can be successfully returned to fire-dependent ecosystems within and adjacent to wilderness is a major factor in the long-term benefits of these areas as sources of intact properly functioning ecosystems. This varies by wilderness area because historic fire regimes vary with vegetation cover types. Management of wildlife and fish populations and control of noxious weed invasions both within wilderness and on adjacent lands, are other important contributors to the broad functioning of wilderness ecosystems. Finally, management of livestock grazing and recreation use to maintain wilderness values will affect the long-term role that wildernesses can play in contributing to biodiversity and sustainability of the larger systems of which they are a part. These factors do not vary significantly by alternative specifically for areas designated as wilderness, therefore cumulative effects to wilderness would be similar for all alternatives.

Topic 6 - Timber Suitability

Introduction

National Forests have long been a provider of forest products for lumber and many other uses. This topic discussion is intended to meet requirements for analyzing timber suitability for forest planning. The affected environment section provides information on the recent history of timber production related to the Wasatch-Cache, and this is followed by a discussion of the environmental consequences of the six alternatives that are being analyzed.

Laws, Policy, and Direction

The **National Forest Management Act of 1976** requires identification of areas suitable and available for timber harvest and determination of the Allowable Sale Quantity (ASQ) from those lands, and the certification of reforesting those lands within five years following harvest.

Affected Environment

The National Forest Management Act and its implementing regulations require identifying those lands that area suitable for timber management. Suitable lands include forested lands outside of withdrawn areas (such as designated Wilderness) where reforestation can be assured and timber management activities can take place without causing irreversible resource damage to soils productivity or watershed conditions. Regulations require that lands identified as not suited for timber production be examined at least every ten years to determine if they have become suited (36 CFR 219.12(k)(4)(ii)).

The assessment of suitable timberlands identifies two categories: "tentatively suited" lands are those available forest lands that are physically suited for potential timber management, and "suitable" timberlands are that portion of the tentatively suited lands determined appropriate for timber management under a given alternative. Tentatively suited lands are the same for all alternatives. Suitable lands may be thought of as those lands that are capable of growing forest stands, available for timber production and management, and managed under a prescription category (5.2 and 6.2), with an emphasis on managing timber for growth and yield, while maintaining or restoring forested ecosystems. The acreage of suitable lands varies between alternatives depending upon the management prescriptions applied within the alternative. The suitable lands for each alternative are evaluated to determine the range of potential timber harvest levels for that alternative.

Two terms are used to describe timber harvest levels: the Allowable Sale Quantity (ASQ) and The Long Term Sustained Yield Capacity (LTSYC). Allowable Sale Quantity is a term that is frequently misunderstood. The ASQ is the maximum amount of timber that may be offered for sale each decade for a given alternative. It is a management-determined limit that has been analyzed and shown to be sustainable over time without exceeding the growth on those lands. Timber that contributes to ASQ comes from suited timberlands and varies by alternative. The

Long Term Sustained Yield Capacity represents the maximum level of sustainable timber production that suitable lands are capable of producing, and may be greater than the ASQ. It may not be less than the ASQ, however.

Timber harvest may also occur on unsuited lands that are within management prescriptions such as 5.1, 6.1, 3.1, 3.2, 4.3, and 4.4. These prescriptions while not emphasizing commodity production, allow the use of timber harvest to achieve management objectives. The volume produced from these lands therefore would be incidental to other management objectives and not included in the ASQ. The timber sale program for the Forest is the total of the ASQ volume (from MPC 5.2/6.2) and the volume offered from other MPCs.

Table TM-1. displays the timber volume offered and sold since the 1985 Forest Plan was signed. Units are million board feet (MMBF) and thousand cubic feet (MCF).

Table TM-1. Timber volume offered and sold since inception of Forest Plan in 1985.

FiscalYear	Offered		Sold	
	MMBF	MCF	MMBF	MCF
1986	13.9	2780	12.9	2580
1987	11.8	2360	11.5	2300
1988	12.4	2480	12.4	2480
1989	14.2	2840	14.0	2800
1990	8.6	1720	8.6	1720
1991	10.0	2000	10.0	2000
1992	10.0	2000	10.0	2000
1993	10.0	2000	10.0	2000
1994	5.5	1100	4.6	920
1995	2.4	480	1.8	360
1996	6.6	1320	1.7	340
1997	5.4	1080	7.5[1]	1500
1998	5.7	1140	7.6[1]	1520
1999	3.1	620	5.0[1]	1000
2000	4.7	940	4.7	940

Timber Market and Demand

The Wasatch-Cache is a competitive market for timber sales; most sales offered receive bids from two or more bidders. Occasionally, a sale will receive no bids on the initial offering. There are several reasons sales may receive no bids at the initial offering, including market conditions, and sale characteristics such as species, minimum bid price, timing restrictions, etc. Sales that have been prepared in the past few years have been driven by a wide range of objectives designed to meet multiple resource needs. These sales include a larger percentage of smaller, less valuable trees than in the past and are more expensive to harvest. This occasionally has resulted in a sale receiving no bids, especially when the market is high. However, all sales that

[1] Sold volume totals that exceed the offered volume reflect sales receiving no bid in prior years that subsequently were reoffered and sold in the current year.

received no bids have been reoffered and subsequently sold. Demand for timber is not a limiting factor in the timber program on the Wasatch-Cache.

The Forest participates in the Small Business Administration timber program. A certain percentage of the sales offered by the Forest are "set-aside" to be processed by small business under this program. The percentage is recalculated every 5 years, and was recomputed in the fall of 2000. Currently, 66% of the Wasatch-Cache timber sales must go to small business. Several small businesses operate mills adjacent to the Wasatch-Cache National Forest and depend upon the forest to provide a portion of their supply. These include Blazzard Lumber, Leavitt Lumber, and Thompson Logging in Kamas, UT; Ayres and Baker in Mountain View, WY; Jensen Lumber in Ovid, ID. Intermountain Resources of Montrose, CO also has recently purchased sales from the Forest. One large business, Louisiana-Pacific, operates mills in Belgrade and Deer Lodge, MT and Saratoga, WY which process timber purchased on the Forest. There are also several small companies and individuals that purchase small sales.

The location of these mills reflects a significant change in the market situation since the initial Forest Plan was developed. Traditionally, all the volume sold on the forest was processed at mills in local communities. In the past 3 or 4 years, bidders from outside the local area have begun to look to the Wasatch-Cache as a source for timber, with the result that we are now selling timber to processors in adjacent states as well as local mills. This reflects the need for mills to expand their source areas to meet demand

Changes in Suitability Based on Implementation and Monitoring Results

The Five Year Monitoring Report (USFS, 1992) identified several areas that needed to be addressed during plan revision, including timber availability assumptions, technical feasibility and implementation assumptions, and integrated resource analysis procedures. The 1985 Forest Plan identified 166,000 acres of suited lands, much of it located within inventoried roadless areas.

Technical concerns centered on harvest method assumptions and implementation of Forest Plan standards and guidelines. The monitoring report found that during implementation of the plan, land management prescriptions applied on the ground differed from what was proposed in the plan. For example, harvest in high elevation spruce stands was modeled to occur in two or three entries. In reality, the silvicultural prescriptions currently being applied involve selection harvest, which results in lower yields per entry than the 1985 plan projections. The 1985 plan also projects growth response from thinning in dense, small diameter stands of lodgepole pine on the North Slope of the Uinta Mountains. Subsequent monitoring and analysis has indicated that many of these stands will not respond to thinning. The monitoring report indicated that these stands should be removed from the suitable base or identified as a separate component until markets for this material develop. In addition to the problems meeting expected outputs forecast in the Forest Plan, implementation of standards and guidelines has resulted in deferral of some expected treatments. The monitoring report identified hiding cover and leave strips adjacent to harvest units as examples of standards and guidelines that are affecting timber production on the forest.

In the process of Plan implementation, site-specific analyses have repeatedly revealed areas of high water tables and wet "pothole" complexes, primarily on the North Slope Uinta Mountains, that were not identified during the 1985 Forest Plan development. These areas where regeneration is difficult, or irreversible soil damage may occur by use of ground based equipment and road construction have been reclassified as not tentatively suited for timber management and removed from the suitable timber base.

More recently, standards and guidelines in the 1985 Plan have been modified to provide habitat for sensitive species that were not addressed in the original plan. An example is the northern goshawk; guidelines have been developed and a forest-wide amendment completed that is incorporated in the proposed revised plan.

The 1985 Forest Plan projected harvest on approximately 5,300 acres in roadless areas on the North Slope. In reality, harvest activity has occurred on approximately 1,200 acres of these lands. Treatments have been deferred due to the sensitive nature of roadless lands, and the need to reevaluate long-term management objectives for these areas.

Timber outputs in revision are based on the integration of goals which address the multiple values and uses of a given management area. Prescriptions applied vary by alternative to reflect a range of approaches to timber and forestland management.

Insects and Disease

Insect caused mortality is a normal function of the forest ecosystem. Most of the major forest insects attack and kill individual trees or small groups of large, old trees, frequently of low vigor or under stress from drought or root disease. However, if the population increases dramatically, large numbers of trees may be attacked, resulting in widespread mortality over extensive acreages. The lack of fire within existing forests of the Wasatch-Cache has skewed stand structure toward older age classes, with high numbers of large diameter trees per acre. These conditions increase the potential for extensive insect related mortality. The large continuous acreage of older, dense forests provides a suitable host to support insect populations and allow endemic levels of activity to rapidly increase to epidemic levels.

Several insect species have been active on the Forest since the plan was implemented. The largest impact has been from the mountain pine beetle on the North Slope. An epidemic occurred around the time the plan was signed which resulted in high mortality levels in lodgepole pine stands occupying approximately 150,000 acres on the Wasatch-Cache and Ashley National Forests. Salvage logging to remove the dead trees was conducted over 1200 acres on the east end of the Mountain View Ranger District, concluding in the spring of 2000. Standing dead trees still occupy several hundred acres in the roadless area to the south of Beaver Meadows Reservoir and west toward Hoop Lake. Root systems of the trees are now deteriorated to the point that significant wind throw is expected in the near future, which will substantially increase fuel loadings. Currently, mountain pine beetle populations are at endemic levels in this area. Aerial surveys completed in fiscal year 2001 indicated low levels generally across the forest, with some increased mortality in the Smith and Morehouse, Beaver Creek and North Fork Provo

River areas on Kamas District. A limited beetle suppression effort within campgrounds and undeveloped sites on the Kamas District is currently underway.

Douglas-fir bark beetle activity is generally decreasing across the forest, although pockets of mortality occur on every District. Large groups of mortality continue to be recorded near Spawn Creek, Rigby Hollow, Beaver Mountain and Tony Grove Lake on the Logan District. Douglas-fir Tussock Moth caused extensive mortality of subalpine fir and Douglas-fir on 2250 acres of the Ogden Ranger District in 1990. Dead trees were salvaged from the area over the next two years. No other outbreaks of this insect have been detected since that time.

Drought in the late 1980's to early 1990's led to a large increase in western balsam bark beetle populations. Western balsam bark beetles continue to kill groups of subalpine fir across the Forest, but in general populations are considered to be at low levels.

Englemann spruce beetle has increased on the Logan, Ogden, and Evanston Ranger Districts since the 1985 Forest Plan was developed. Spruce beetles were found west of Whitney Reservoir on the Evanston District in 1988, infesting trees that had been blown down the previous year. Salvage efforts to remove the down trees and the use of pheromone baits to control the populations were completed over the next four years. Approximately 1000 acres were treated in this manner. A second area was impacted a few years later; approximately 1000 acres of spruce-fir stands were attacked in 1995 in the vicinity of the T.W. Daniels Experimental Forest on the Logan District. Aggressive suppression activities consisting of removing beetle infested trees and the use of pheromone traps were conducted in 1996 and 1997 in an attempt to prevent an increase in the insect population. At the same time, spruce beetle was also rapidly increasing on the Ogden District, extending from Dairy Ridge north to the Spencer Basin area. The same suppression strategy was employed in that area in 1998 and 1999. Both suppression attempts were successful in reducing the populations.

The use of suppression techniques did not dramatically alter the stand conditions, however, leaving the residual spruce susceptible to further infestation (Bentz and Munson, 2000). A timber sale has been prepared to treat spruce stands in the vicinity of Daniels Experimental Forest in an attempt to limit the effects of future outbreaks and regenerate the spruce component. Treatment consists of removing small groups of mature trees and planting spruce seedlings, and commercial thinning the surrounding stands to maintain vigor of the trees and reduce their susceptibility to beetle attacks. This proposed sale has been delayed as a result of litigation. Examination of the Logan treatment area during the summer of 2002 indicated increased beetle activity, with numerous recently attacked trees.

Aspen defoliation and dieback has been mapped on several districts. Over 600 acres on the Logan District, 600 on the Kamas District, over 1000 acres on the Salt Lake District, and several thousand acres on the Ogden District are affected. The cause of this discoloration and leaf dieback are unknown at this time.

Environmental Consequences

Effects on the Timber program from the various alternatives depend upon the amount and the quality of the timber offered for sale. The amount offered annually is important to lumber mills dependent upon National Forest timber in planning their operations. The quality of the timber offered, specifically such variables as size of the timber, degree of insect and disease problems and species composition, affect the value and economic feasibility of the offering. Other factors that influence a prospective purchaser's decision whether or not to bid for National Forest timber include accessibility, distance from the mill and special requirements or contract provisions that have the potential to increase the cost of timber processing.

As explained in the affected environment section, the ASQ represents the maximum amount of timber that can be offered for sale each decade from suitable lands. That level has been analyzed and shown to be sustainable over time without exceeding the growth on those lands. It is not, however, a guaranteed output level. The actual output will be determined through site-specific analysis. Timber that contributes to ASQ comes from suited timberlands and varies by alternative.

In addition to the ASQ volume, some volume may be derived from management efforts on the unsuited lands that fall within management prescriptions that allow timber harvest. This non-ASQ volume would not be offered on a regular basis, but would depend upon opportunities arising through management for non-timber objectives. This volume, together with the ASQ volume is the Total Sale Program Quantity (TSPQ).

General Effects

Each alternative differs from the others in the amount of lands available for timber management as well as the objectives for timber management. Each, therefore, affects the timber program differently.

Alternative 1

This alternative allows natural processes to prevail, and all lands would be considered not suited for timber production. Timber harvest would not be used to meet other resource objectives. No volume would be offered under this alternative; it would therefore eliminate timber as a program in the Wasatch-Cache. Mills that are dependent upon National Forest timber would have to find other sources or go out of business. Small local mills would be most affected due to their inability to compete with larger mills that can draw from larger source areas to meet their needs.

Alternative 2

Alternative 2 emphasizes restoring natural processes with active human management, conservation of large roadless areas, and allowing uses where they are compatible with restoration or maintenance of properly functioning conditions. This alternative designates no lands as suited for timber production; therefore, the allowable sale quantity would be zero. However, it does allow harvest of timber to meet other resource objectives. The timber program

could continue with the purpose of restoring processes, but timing of offerings would be irregular and the volume would vary considerably. Up to 650 acres of tentatively suitable lands could be harvested annually under this alternative, providing up to 4200 CCF (2.1 MMBF). Harvest would concentrate on vegetation types that are considered at risk, such as bark beetle susceptible stands of spruce and lodgepole pine, and aspen stands that are subjected to conifer encroachment. A substantial volume of aspen and relatively low quality fir would likely be available from restoration efforts. Timber within some inventoried roadless areas would be available under terms of the National Roadless Area Conservation Rule, however that availability is so limited that it is unlikely much timber volume would be supplied from roadless lands (see discussion below under effects on timber management from inventoried roadless area management).

The effect of this alternative on local mills would depend upon their having an existing market or developing a market for lower value species, and a source of supply to provide for their demand between National Forest offerings. Currently, there are limited markets for aspen and fir in the Wasatch-Cache area. This alternative would have less effect upon the local mills than Alternative 1, but would provide less volume on a regular basis than the other alternatives. Mills would not be able to count on a steady supply sufficient to meet their capacity.

Alternative 3

This alternative emphasizes ecosystem functioning and sustainability while providing some commodity outputs. It designates 38,000 acres as suitable, where management activities would focus on timber production. Road construction is permitted in some inventoried roadless areas depending on management prescription. Approximately 225 suitable acres would be treated annually, providing an ASQ of approximately 3400 CCF (1.6 MMBF) annually. Additional volume might be available from unsuited lands with prescriptions that allow harvest, but not on a regular basis. A maximum of 525 acres of unsuited lands could be harvested in this alternative, providing up to an estimated 3400 CCF (1.6 MMBF). Sale offerings would depend upon opportunities and funding as in Alternative 2. A majority of ASQ volume offered would be conifer, while volume from other than suited lands would include a greater percentage of aspen and low quality fir. The volume of timber provided by this alternative would be less than that needed to supply one mill on an annual basis, but would contribute volume toward meeting that demand.

Alternative 4

Alternative 4 continues management under direction of the 1985 Forest Plan as amended to address needs for change identified since 1992. Adjustments have been made in the tentatively suited lands due to operability and other concerns. It designates 193,900 acres as suitable for timber production. More of the inventoried roadless areas would be available for treatment and road construction than Alternative 3. Approximately 625 suitable acres could be treated annually, resulting in an ASQ of approximately 6700 CCF (3.3 MMBF). Approximately 20% would be aspen. As with Alternatives 2 and 3, some additional volume could be made available from unsuited lands, depending upon funding and opportunities. An additional 625 acres of unsuited lands could be treated under this alternative, providing an additional 5800 CCF (2.9

MMBF). This alternative would contribute significantly toward meeting local demand, but would not satisfy it completely.

Some reallocation of funds into the timber program would be necessary to achieve this level of output from suited lands.

Alternative 5

Alternative 5 is designed to address the concern that the Forest should be used to directly benefit local economies by providing predictable, sustained outputs while allowing a variety of other uses. This alternative designates the largest amount of suited lands of any alternative. Most of the current roadless areas would be available for harvest and road construction. A total of 226,000 acres would be considered suitable for timber production. Approximately 1250 acres would be treated annually, with an ASQ of approximately 12500 CCF (6.2 MMBF). With the emphasis on providing raw material for industry, treatments would concentrate on developing high quality material. Species mix and size and quality of timber offered for sale would tend to make sales under this alternative more economical and desirable to industry than any other alternative. The level of offered volume would completely satisfy the demand for one or two local mills.

As with the other alternatives, some additional volume could be made available from unsuited lands to achieve objectives other than timber production. However, with the increase in the amount of suitable timberlands, and the corresponding reduction in the acreage of unsuited lands, this contribution is estimated to be relatively small. Up to 310 unsuited acres could be treated annually, providing an additional 2400 CCF (1.2 MMBF).

Producing this level of timber would require a significant shift in dollar allocation within the Forest budget. This would require additional staffing to complete sale planning, preparation and administration activities.

Alternative 6

Alternative 6 emphasizes biodiversity by conserving large roadless areas and concentrating activities in areas where they can be sustained. Harvest would be allowed on 28,900 acres of suitable timberlands, virtually all of which are located in the Uinta Mountains. Approximately 200 acres of suitable lands would be treated annually, generating an ASQ of approximately 4000 CCF (2.0 MMBF). Additional volume would be available from other management prescription lands as with the other alternatives. An additional 300 acres of unsuited lands could be treated annually, providing up to an additional 4800 CCF (2.4 MMBF). These treatments would concentrate on restoration of forest types identified as at risk, specifically spruce and lodgepole pine stands, and aspen encroachment areas. Roadless areas might contribute some volume, but only under the terms of the National Roadless Area Conservation Rule.

This effect of this alternative on local mills is similar to the effects of Alternative 3.

Alternative 7

Alternative 7 is similar to Alternative 6, but has more suitable timberlands and does not implement the Roadless Area Conservation Rule. Harvest would be allowed on 28,900 suitable acres, all of which are located in the Uinta Mountains. Approximately 200 acres of suitable lands would be treated annually, generating an ASQ of approximately 4000 CCF (2.0 MMBF). As with the other alternatives, additional volume may be provided by treating unsuited lands to achieve management objectives and the desired future condition. An estimated 500 acres could be harvested annually from the unsuited lands, generating an additional 5000 CCF (2.5 MMBF). As with the other alternatives, harvest from the unsuited lands is uncertain and irregular in its offerings.

The effect of this alternative on local mills is slightly more beneficial than Alternative 6, and less than Alternatives 4 and 5.

Table TM-2. Available Timberland by Alternative

Available Timberland[2]	Alt.1	Alt. 2	Alt.3	Alt.4	Alt. 5	Alt.6	Alt.7
Suited for Timber Production (Acres)[3]	0	0	38,000	193,900	226,000	28,900	28,900
Unsuited *and* Harvest Allowed[4] (Acres)	0	79,900	131,600[5]	55,200	71,800	72,100	171,400
Total Acres	0	79,900	169,600	249,100	297,800	101,000	202,100

Allowable Sale Quantity, Total Sale Program Quantity and Long-Term Sustained Yield Capacity

As stated in the opening paragraphs of this section, timber yield from a given alternative is expressed as three separate but related values. The Allowable Sale Quantity is the maximum volume that may be offered under the alternative from the suited lands. The Total Sale Program Quantity is the potential yield from suited and non-suited lands. The non-suited contribution to TSPQ is not a regularly scheduled yield, but depends upon other resource objectives and opportunities. The Long-Term Sustained Yield Capacity represents the maximum potential from suited lands only. Table TM-3. presents these levels in both cubic and board foot measures.

[2] From GIS layer of available capable aspen and conifer merged with management prescriptions for each alternative.
[3] Areas available and capable with Management Prescription 5.2 or 6.2.
[4] Areas available and capable with Management Prescriptions that allow other harvest for non-timber objectives.
[5] Of these acres, an estimated 60,000 allow harvest but no road construction.

Table TM-3. ASQ, TSPQ And LTSYC Estimates From VDDT For All Alternatives In Millions Of Cubic Feet (mmcf) and Millions of Board Feet (mmbf)

		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt. 7
ASQ	mmcf/yr	0	0	.3	.67	1.3	.4	.4
ASQ	mmbf/yr	0	0	1.6	3.3	6.2	2.0	2.0
TSPQ	mmcf/yr	0	.4	.6	1.28	1.55	.81	.9
TSPQ	mmbf/yr	0	2.1	3.2	6.2	7.4	3.9	4.5
LTSYC	mmcf/yr	0	0	1.0	4.9	4.9	.87	.87
LTSYC	mmbf/yr	0	0	5.0	25.0	25.0	4.3	4.3

Effects on timber management from recreation and scenery management

In areas managed for timber production (Management Prescription Category (MPC) 5.2/6.2 which varies by alternative), recreation activities may need to be curtailed during actual harvest activities to ensure public safety. Scenic integrity objectives are matched with management prescription categories so that where timber production is emphasized (MPC 5.2/6.2), the scenic integrity objective (low) allows for dominant changes in landscape character over the short term. Timber harvest is not allowed in areas managed for developed recreation (MPC 4.5) except for purposes of removing hazard trees and ensuring future tree cover where desired. MPCs 4.1 and 4.2 emphasize non-motorized recreation and do not allow timber harvest. Prescription 2.5 is scenic byways and also does not allow timber harvest. In areas with recreation prescriptions that allow timber harvest, scenic integrity objectives must be incorporated into harvest design and may affect the amount of volume as well as harvest operations. Site-specific analysis must incorporate scenery management according to the prescription and also the degree of sensitivity of the area for viewing by recreation users. Timber operations may be subject to timing restrictions for public safety in areas with heavy recreation use. The effects on timber management are directly related to the amount of suitable land; the greater the proportion of suitable lands, the less restrictive the recreation and scenery management effects. Recreation and scenery management effects will be greatest in Alternative 2, since that alternative has no suitable base. Conversely, Alternative 5 will have the least recreation and scenery effects, because it has the greatest total acreage of suitable lands. Effects for Alternatives 3, 4, 6 and 7 will be between these two extremes, in proportion to the total suitable lands with each alternative.

Effects on timber management from inventoried roadless area management

Management of inventoried roadless areas varies significantly by alternative and has a direct effect on availability of forestlands for timber harvest. Alternative 1 does not allow timber harvest anywhere, regardless of prescription. In other Alternatives, areas recommended for (MPC 1.5) are not available for harvest of timber. Alternative 2 has the most acres of tentatively suited timber recommended for wilderness at 39,000 acres. Alternatives 4 and 5 do not recommend any inventoried roadless areas for wilderness. Alternatives 3, 6, and 7 are intermediate, with 9,000, 13,500, and 14,000 acres respectively, of tentatively suited lands recommended for wilderness.

In Alternatives 2 and 6, the National Roadless Area Conservation Rule (Federal Register, January, 2001) is applied as an overlay to all prescriptions. Road construction and reconstruction are not allowed in inventoried roadless areas, nor is cutting, sale, or removal of timber except: for the cutting, sale or removal of generally small diameter trees which maintains or improves roadless characteristics *and*: 1) to improve habitat for threatened, endangered, proposed, or sensitive species, or 2) to maintain or restore ecosystem composition and structure, such as reducing the risk of uncharacteristic wildfire effects. Given this, regardless of whether the prescription usually would allow timber harvest, in all inventoried roadless areas, unsuited acres in Alternatives 2 and 6 are essentially not available for conventional timber harvest. In Alternatives 3, 4, 5, and 7, some roadless areas are managed under prescriptions that allow timber harvest, while others are not. The acres of available timber shown above in Table TM-2 reflect differences in roadless area prescriptions that allow more timber harvest opportunities in Alternatives 3, 4, and 5, than in Alternatives 2 and 6. Alternative 7, with 171,400 acres of unsuitable land provides more harvest opportunities than 2, 3 and 6, and less than 4 and 5.

Effects on timber management from fire and fuels management

Fire and fuels management play an important role in reaching desired future conditions, a role that varies by alternative. Projected use of fire along with mechanical treatment of fuels and varying degrees of timber harvest are tools for returning vegetation to properly functioning conditions. Use of fire is allowed in areas managed under prescription 5.2 and 6.2 in all alternatives, but stand-replacing fires will generally not be used in forest stands within these MPCs. Therefore, the primary difference between alternatives is in the number of acres of unsuited lands that occur in MPCs that do not emphasize timber. Alternatives 2, 3, 6, and 7 allow prescribed fire to be used as a primary tool in many areas that Alternatives 4 and 5 dedicate to timber production (MPC 5.2). Alternative 2 has the highest acreage of projected fire use. Projected burning in Aspen/Conifer and Conifer/Aspen cover types in Alternatives 2, 3, 6, and 7 would reduce the total volume available for timber harvest. In alternatives 4 and 5, timber production and harvest are emphasized with concurrent de-emphasis of prescribed fire. Fuels management priorities are primarily in the urban wildland interface in oakbrush, and therefore will have little effect on timber management. Fuels management in conifer cover types can be accomplished with timber harvest, however materials removed will tend to be smaller size, and lower value and quality than needed to meet commercial timber demand.

Effects on timber management from wildlife and aquatic resources management

Standards, guidelines, and conservation strategies included in the Proposed Forest Plan apply to all alternatives and as such guide timber management to maintain biodiversity, species viability and habitat protection and improvement. These generally have effects on the amount of area that can be harvested, the type of harvest allowed, volume available, methods of handling snags and large woody debris, sizes of trees to be removed or left, management of roads both during and after harvest, and timing of harvest activities.

In Alternatives 2 and 6, terrestrial wildlife habitat is emphasized (MPC 3.2) on an estimated 32,000 and 29,000 acres respectively of unsuited acres. Although this prescription does not

allow “commercial timber harvest”, some timber could be removed as part of a vegetation treatment to meet habitat objectives. In Alternative 3, terrestrial wildlife habitat is emphasized (MPC 3.2) on an estimated 80,000 unsuited acres. Again some timber could be removed on all of these acres, but in Alternative 3, road construction would not be allowed on the 55,000 inventoried roadless acres included, thus restricting the type and amount of access. In these areas, terrestrial wildlife habitat objectives would shape all aspects of any timber removal. Prescribed fire could also be considered in the same areas if it met habitat objectives. Site-specific analysis would decide what tools (timber removal, burning or a combination) should be used to meet objectives for habitat. Therefore these acres could not be counted upon for regular sustained volumes or high quality materials to be removed. In Alternatives 4 and 5 terrestrial habitat emphasis (MPC 3.2) applies to 1,700 and 7,700 acres respectively but commercial timber harvest is allowed. Therefore, timber harvest in these areas would be designed to achieve habitat objectives and might result in different treatment (less volume, more restrictions) than would be the case in an area where timber production is being emphasized (MPC 5.2).

Alternative 7 uses slightly different MPCs than the other alternatives. Terrestrial habitat emphasis (MPC 3.2) has been divided into those lands that can be developed (3.2d) and those where development is not allowed (3.2u). Timber harvest is permitted on 40,800 acres of 3.2d in Alternative 7, and not permitted on 46,800 acres of 3.2u. As with the other alternatives, this harvest would not be offered on a regular basis, and may include species or sizes of trees that are less commercially valuable than those on suitable lands.

The recent listing of the Canada lynx as a Threatened species under the Endangered Species Act may affect timber management, primarily by delaying pre-commercial thinning of dense, young lodgepole pine stands. This effect is not alternative dependent, because requirements are applicable to all lands within the habitat, regardless of prescription. The lynx guidelines state that precommercial thinning in lodgepole pine stands may be allowed if it is shown to result in enhancement or maintenance of snowshoe hare and lynx habitat. The primary effect would occur in those stands that cannot meet the above criteria. In stands that cannot be thinned, the effect would be to reduce the growth rate of trees due to competition and delay the growth into a merchantable size. The length of the delay would vary depending upon site quality and growth rates of the individual stands but could last for up to 20 years.

Lynx guidelines may have some limited effect on timber yield, depending upon the amount of unsuitable habitat within a particular Lynx Analysis Unit (LAU). The guidelines state that management activities may not change more than 15% from suitable to unsuitable habitat condition within a 10 year period, and that in LAUs with 30% or more habitat in an unsuitable condition, no vegetation management activities that would further increase unsuitable conditions would be allowed. This effect is expected to be minor, because no LAU currently exceeds 15% in an unsuitable condition, and no alternative harvests sufficient acreage to exceed the threshold levels of disturbance. For example, the alternative with the greatest number of acres harvested in a decade (Alt. 5) harvests only 12,400 acres from suitable lands forest-wide in the first decade. This equates to approximately 5% of the total suitable acreage in the alternative. It is unlikely that the entire 12,400 acres would fall within a single LAU, but would be spread throughout the suitable lands. Therefore, the effect is relatively minor.

In alternatives 2 and 6 watershed integrity and aquatic habitat are emphasized (MPC 3.1) on an estimated 58,000 and 41,000 acres of the unsuited acres. As above for terrestrial habitat, these areas do not allow commercial timber harvest but do allow vegetation treatment. For any removal of timber, riparian and aquatic habitat objectives would shape all aspects of timber harvest. Prescribed fire could also be considered in the same areas if it met objectives. Site-specific analysis would provide for decisions on what tools (timber harvest, burning or a combination) should be used to meet objectives for habitat. Therefore, timber harvest in these areas would be designed to achieve habitat objectives and might result in different treatment (less volume, more restrictive design) than would be the case in an area where timber production is being emphasized (MPC 5.2).

Alternative 7 subdivides MPC 3.1 into two separate categories: 3.1a, which allows harvest for aquatic habitat purposes, and 3.1w, which emphasizes watershed integrity and does not allow harvesting. In this alternative, 11,400 acres of unsuited lands are included in 3.1a, and 32,400 acres of unsuited lands are in MPC 3.1w. This alternative has more of the unsuited lands in a restrictive prescription category than does either Alternative 2 or 6.

Effects on timber management from insects and disease

As described in the affected environment section, insect and disease caused mortality is a normal function of the forest ecosystem. However the degree to which populations increase dramatically, attacking large numbers of trees and potentially resulting in widespread mortality over extensive acreages can be influenced through timber management. Alternative 1 has the highest potential for insect and disease outbreaks that could affect potential values of timber. Alternative 5 provides the greatest level of active stand structure management, and would therefore have the lowest potential for insect outbreaks.

Effects on timber management from Research Natural Areas and Special Interest Areas

Research Natural Areas (RNA) are withdrawn lands and are therefore not available for timber harvest under any alternative. Management Prescriptions for Special Interest Areas (SIA) do not allow commercial timber harvest, but they do allow for vegetation treatment including tree removal for purposes of research, education, and/or to maintain or protect values for which the area was established. Alternative 1 does not allow timber harvest anywhere regardless of prescription. Alternative 2 and 6 include an estimated 7,000 and 6,000 acres, respectively, of SIA lands that are unsuited. The total unsuited SAI land in Alternative 7 is between Alternatives 2 and 6 (6400 acres). These lands cannot be counted on for any kind of sustained timber production. In Alternatives 3, 4, and 5 SIA acres are not tentatively suited and therefore have no effect on timber management.

Effects on timber management from Soil and Water Resources Management

Soil and water resources are addressed in all timber management activities, regardless of Alternative. The major effects on the timber resource are in mitigation of potential effects, and practices to avoid adversely impacting the soil and water resources. Practices such as timing

restrictions on harvesting activities during wet periods will be analyzed in all harvest proposals and implemented wherever necessary under all alternatives.

Effects on timber management from Oil and Gas Resources Management

Oil and gas management affects timber management primarily during the development stage. In the past, timber harvest has been deferred in the vicinity of oil and gas development to eliminate the combined impacts of harvest and development. This restriction has only been applied during the development stage, and represents a temporary limitation on timber management. Oil and gas development benefits timber management through the development of a high standard road system to service the well sites. These roads can be used to access timber that would otherwise be inaccessible or require timber road construction, if site-specific analysis determines the road should remain in place. The likelihood of effects from oil and gas development on timber management is greatest in Alternative 5 and the smallest in Alternative 1.

Effects on timber management from Heritage Resources Management

Heritage resources effects are similar to soil and water in that they apply to all harvest proposals, regardless of alternative. The effects of heritage resources tend to be tied to a specific location and are addressed by avoiding disturbance to the location. The probability of encountering significant heritage resources increases with increasing area available for timber harvest. Therefore, Alternative 5 would most likely have the greatest impacts from heritage resources, although the effect is considered to be small.

Effects on timber management from livestock grazing

Grazing by wildlife and domestic livestock affects timber management primarily through browsing or trampling damage to young conifer and aspen seedlings. Such damage tends to occur along trails and where topography and water sources cause animals to congregate. In some cases the concentration of animals may prevent the establishment of tree regeneration in these areas. Repeated browsing of aspen sprouts by livestock or wildlife may affect aspen stand structure over time. The repeated removal of sprouts may result in more open stands than would otherwise occur. This tends to be limited to those areas where the animals congregate and is therefore relatively limited. Grazing effects to conifer stands occur primarily through trampling and are limited to concentration areas.

Livestock grazing is not prohibited under any alternative, and although acres of suitable rangelands vary by alternative, actual grazing impacts are dependent on herding, salting, and maintenance of improvements such as fences. Grazing impacts on timber management generally have not been significant with current grazing levels and, therefore, effects are similar for Alternatives 1 - 7.

Cumulative Effects

Timber management in the National Forest has effects on, and is affected by, adjacent state and private lands management. When insect and disease outbreaks are ignored, especially after

periods of drought and if forestlands are primarily mature and old, they can move through an entire landscape regardless of ownership. Wildfire is another area where adjacent land ownerships can have an effect on National Forest lands and vice versa. Alternative 1 has the greatest potential for impacts to non-national forest timber management because of highest likelihood of insect, disease, and uncharacteristic wildfire. Alternatives 2, 3, 6, and 7 project a combination of prescribed fire and harvest to return stands to a mix of age classes that would be more resistant to uncharacteristic disturbance. Alternative 2 would potentially have the greatest effect on prevention, with Alternatives 3, 6 and 7 at about half the acres treated. Alternatives 4 and 5 use more harvest and less prescribed fire with total acres treated at about half of that for Alternatives 3 and 6.

The timber program of the Wasatch-Cache National Forest is influenced by and has effects on a new timber economy that is emerging in the State of Wyoming. This economy has been shaped by a series of significant changes (Rideout and Hesseln, 2000). The following excerpts from this report highlight factors affecting timber management in the broader context:

“Nearly half of the volume processed in Wyoming's mills now comes from private supplies. With continuing industry consolidation, Forest Service sales face increased competition from state and private sources and the prospects of fewer bidders and longer haul distances. In essence, the Forest Service stumpage market position is changing from that of a dominant supplier to competitor with other sources. To the extent that such trends continue, a natural outcome would be to see more negotiated contracts with purchasers as the agency seeks vegetative services on low quality material and receives fewer bids per sale resulting from consolidation.

Private supplies remain unknown with certainty but will play a greater role in the future of Wyoming's timber industry. Our interviews of processors suggested both declining private volumes under contract, and a historical recognition of underestimating the quantity and resilience of private supplies (primarily to a confusion between inventory and supply). Wyoming's private timber supplies are often associated with multi-function ranches and affected by the price of timber relative to other ranch products and services such as the price of beef. To the extent that private timber continues to increase in importance, expanding extension services could be considered.”

Data from the State of Utah presents a similar pattern of declining public land timber and increasing private harvesting. In 1966, public lands provided 90% of the timber supply within the state. By 1996, the public land contribution had fallen to approximately 60%.

Timber management activities on private lands adjacent to the National Forest may have an effect on management on the Forest. Site-specific analysis for proposed sales considers the reasonably foreseeable activities on private lands. Depending upon the level and location of such activities, National Forest management may have to be deferred, delayed or modified to meet watershed level objectives. This effect is assumed to be greatest with alternatives 4 and 5, which have the greatest amount of suited lands, and therefore most likely to have treatments proposed in areas with adjacent private holdings.

Topic 7 – Rangeland Capability and Suitability

Livestock Grazing/Range Management

Introduction

The analysis of livestock grazing and range management completed for this Forest Plan Revision is *different than analysis for other resources* because in 1996, a complete Environmental Impact Statement was developed specifically to address needs for range management at the Forest Plan level. This analysis resulted in amendment of the 1985 Forest Plan with management direction needed to guide range management forestwide. Results of that analysis are discussed below and that management direction is applied to all Alternatives and adopted in the Revised Forest Plan. The only other National Forest Management Act required items that still need to be addressed in this Forest Plan Revision analysis are: determinations of rangeland capability, suitability, condition and trend, projected outputs, and actions planned for restoration of lands in unsatisfactory condition. The analysis presented here focuses on these areas and *does not repeat* the in-depth analysis completed to support the Rangeland Health Amendment of 1996.

Laws, Policy, and Direction

Laws and Policies - Numerous laws, regulations, and policies govern the use and administration of rangeland resources on National Forest administered lands. National laws and regulations have also been interpreted for implementation in Forest Service Manuals, Handbooks, and Regional Guides. All grazing activities authorized under permit must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation of grazing practices, and for protection of rangeland-related resources.

Regulations for implementing the **National Forest Management Act (NFMA):** found at 36 CFR 219.220 state "the suitability and potential capability of National Forest System lands for producing forage for grazing animals and for providing habitat for management indicator species shall be determined." These regulations go on to require determinations of lands suitable for grazing and browsing, condition and trend of these lands; estimates of present and potential supply and use of forage, capability to produce suitable food and cover for selected wildlife species; and identification of lands in less than satisfactory condition along with appropriate action planned for their restoration. In addition, alternative range management prescriptions are to consider grazing systems, facilities, land treatment, vegetation manipulation, pest problems, interactions among livestock, wild horses and burros, and wild animals, direction for rehabilitation, and comparative cost efficiency.

Existing Forest Plan Direction - In 1996, the Environmental Impact Statement for the Wasatch-Cache National Forest Rangeland Health Forest Plan Amendment **(**USDA Forest Service, 1996**)** was completed. The purpose of this amendment was to provide enhanced management direction for rangelands forestwide, establishing a framework within which rangelands could be managed until future project level decisions (such as allotment management plans) could be made. Furthermore, the purpose was to define broadly, the desired future condition of rangeland

resources and the standards and guidelines necessary to maintain healthy rangelands, riparian and watershed conditions, and to move toward goals and objectives of the Forest Plan. A premise of this effort was that plants have limits as to how much soil compaction, trampling, and repeated top removal they can withstand and still remain as healthy individuals. Continued high levels of grazing by livestock and/or wildlife can result in decreased individual plant vigor and ultimately changes in overall vegetation composition. The less palatable (and often undesirable) species can increase while palatable species decrease resulting in less favorable conditions for watershed protection and certain wildlife habitat elements. Livestock management, wildlife use, and unmanaged recreation can affect riparian and stream habitats by reducing or eliminating riparian vegetation, increasing soil compaction and/or sedimentation, reducing bank stability, affecting water quality, and impacting habitats for aquatic species. The Rangeland Health EIS considered all of these factors and adopted management direction designed to properly manage livestock grazing and recreation on rangelands.

The in-depth analysis included a history of livestock grazing in the Forest and an extensive assessment of current conditions including: four types of rangeland vegetation (riparian, upland, alpine, and aspen) and watersheds, social and economic considerations, and a number of on-going uses of rangelands including recreation, livestock grazing and wildlife uses. Significant issues considered and used to develop a range of reasonable alternatives included: effects of livestock, wildlife, and/or undeveloped recreation on rangeland vegetation condition; effects of livestock, wildlife, and/or undeveloped recreation on riparian and upland watershed conditions; extent to which habitat and populations of rare (including threatened, endangered and sensitive) species are protected; extent to which grazing practices compete with and impact conditions of important wildlife habitat; extent to which Northern Utah and Southwest Wyoming lifestyles and economies would be impacted by changes in rangeland standards; and the extent to which the Forest Service would be able to effectively and efficiently employ rangeland standards and guidelines.

After completion of full analysis of alternatives and their potential effects, including extensive public involvement, a Plan Amendment Decision established 1) a general description of the "desired future conditions" for four types of rangelands in the Wasatch-Cache National Forest; 2) Standards and guidelines for sustaining ecosystem health in relation to livestock and wildlife grazing and undeveloped recreation uses on rangelands; and 3) A monitoring plan for short-term implementation and long-term trend.

We have reviewed information and conclusions from the Rangeland Health Amendment analysis and found these to still be valid within this plan revision effort. Therefore we will not re-address these items but will incorporate by reference, decisions made there to apply to all Alternatives in this FEIS with one exception. The **Riparian Class rating system** used in the 1996 Amendment has been reviewed and **updated to reflect species at risk needs**. The update addresses riparian areas that provide habitat for "endangered", "threatened", "proposed", or Forest Service sensitive species (i.e. species at risk). With the update, streams supporting these species are automatically categorized as "Class I" which will emphasize the importance of these areas and the desire to meet responsibilities under the Endangered Species Act and Forest Service Policy. See Appendix L of the Forest Plan for the updated rating system.

As stated in the Introduction to this section, there are some additional planning requirements included in NFMA that were not addressed by the 1996 Rangeland Health Amendment. These items are addressed in this FEIS for Forest Plan Revision.

Site-specific Sources of Direction for Livestock Grazing - It should be noted that additional, more-detailed direction for management of livestock grazing is contained in Allotment Management Plans, Annual Operating Instructions, and Term Grazing Permits. These provide site-specific analysis of rangeland condition and trend and decisions authorizing stocking rates, grazing systems, range structural and non-structural improvements such as fences, water developments, and vegetation treatments, and detailed monitoring plans. While the Forest Plan revision is required to consider, estimate and provide direction for some of these over broad land areas, site-specific decisions must be tied to site-specific analyses not accomplished by Forest Planning.

Affected Environment

Capable Rangeland Acres

Capability is defined as "the potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity."(FSM 1905) Using the Intermountain Region Protocol: Rangeland Capability and Suitability Determinations for Forest Plan Revisions (USDA Forest Service 1998b) a capability analysis was completed to identify areas with the physical characteristics conducive to livestock grazing. Appendix B includes a discussion of capability criteria (forage production, steepness of slope, and distance to water) used in this analysis.

The Wasatch-Cache National Forest contains about 1,240,000 acres of National Forest System lands. Using standard criteria and Geographic Information Systems (mapping tools), an estimated 370,000 acres or 30 percent of those lands are classified as "capable" for domestic livestock grazing. The 1985 Forest Plan estimated capable acres at about 36% of 934,767 acres of National Forest System lands. Table RN-1 displays acres of capable rangeland for each Management Area of the Forest. The Bear, Cache/Box Elder, and Stansbury Management Areas contain the greatest percentage of capable rangelands while the Central Wasatch Management Area contains the lowest percentage of capable rangelands. Capable rangelands are the same for all alternatives. All lands, regardless of slope, are capable and suitable for grazing and browsing by wildlife.

Table RN-1. Capable Rangeland Acres by Management Area (rounded to the nearest 100 acres)

Management Area	Total Acres	Percent Capable	Total Capable Acres
Bear	52,300	59	30,700
Cache-Box Elder	291,100	45	131,900
N. Wasatch-Ogden	141,600	22	31,000
Central Wasatch	97,500	10	9,400
Stansbury	68,600	41	27,800
Western Uintas	279,800	25	70,100
Eastern Uintas	308,400	22	69,100
Forest Total	1,239,300	30	370,000

Source: Forest Service GIS database.

Forage Production

An important component of rangeland management is the ability of the land to produce forage. Based on assessments of forage production alone (in pounds per acre), projections are that the Wasatch-Cache National Forest could support much higher grazing outputs (commonly measured as Animal Unit Months) than the average actual use reported annually (Table RN-2). Such a projection based on forage production alone would be misleading and not very useful because it does not represent how livestock allotments in the National Forest are necessarily grazed and managed. When actual topography which is often quite rugged, distances to water, patterns of rangeland vegetation, condition and effectiveness of structural improvements such as fences and water developments, and operator diligence in herding and salting are taken into account, it is clear that actual grazing outputs can be quite variable. These outputs are more accurately addressed at a site-specific analysis scale (such as for a single or group of similar allotments) where all of these factors can be examined together. In the Wasatch-Cache National Forest, capable rangelands within an allotment are frequently widely scattered. Structural improvements are variable in their condition and effectiveness, and livestock herding and management depends on individual operators. Because of this, forage production is not a viable basis for projecting outputs. Instead our best estimates for the required output projections in this analysis, are based on the relationship between acres of suitable rangelands expected to be grazed by alternative, with actual use levels averaged over a ten year period.

Current Livestock Grazing Levels

Table RN-2 displays current and recent past (1990-1999) livestock grazing in terms of permitted and authorized AUMs. The Forest Service defines an AUM as "the amount of forage required to sustain a 1,000-pound animal for one month." Permitted use is that use level displayed on the grazing permit and represents the maximum number of livestock and season of use allowed. Authorized use is the actual numbers and time period of livestock grazing for any given year. It is reported yearly and displayed in the Annual Operating Instructions.

Livestock grazing is permitted during the summer months. The normal grazing season is the middle of May through the middle of September. The average of authorized grazing outputs for the period 1991 through 1999 was 58,934 sheep and cattle AUMs. For the 1999 grazing year, 71,247 animal unit months were permitted, and 62,653 AUMs were authorized and actually grazed. Actual allotment stocking in Head Months (HM) for the year 2000 was 89,706 sheep head-months and 39,627 cattle HM's.

Table RN-2. Average AUMs for the period of 1990 to 1999, based on actual use

Year	Sheep AUMs		Cattle AUM's		Total AUMs		Difference		*Percent Authorized vs. Permitted*	
	Permitted	Authorized	Permitted	Authorized	Permitted	Authorized	Sheep	Cattle	Sheep	Cattle
1990	32,965	29,139	44,785	39,165	77,750	68,304	3,826	5,620	88%	87%
1991	34,118	30,754	46,357	34,366	80,475	65,120	3,364	11,991	90%	74%
1992	31,277	24,341	45,136	37,254	76,413	61,595	6,936	7,882	78%	83%
1993	36,762	24,501	42,759	36,989	79,521	61,490	12,261	5,770	67%	87%
1994	34,389	26,828	44,013	32,874	78,402	59,702	7,561	11,139	78%	75%
1995	31,615	21,579	39,798	33,393	71,413	54,972	10,036	6,405	68%	84%
1996	17,321	14,348	27,146	15,850	44,467	30,198	2,973	11,296	83%	58%
1997	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
1998	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
1999	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
10 year maximum	36,762	30,754	46,357	39,165	83,119	69,919	12,261	11,991	90%	91%
10 year minimum	17,321	14,348	27,146	15,850	44,467	30,198	2,973	3,918	67%	58%
10 year average	30,711	24,613	41,507	34,321	72,218	58,934	6,098	7,186	80%	82%

Source: Forest Service RAMIS database

Demand Versus Use - The extent to which the overall demand for livestock forage is being met can only be inferred. For both cattle and sheep, average authorized livestock use levels (AUMs per year) have consistently been below term permit numbers and seasons. Actual use levels for the ten-year period 1990 through 1999 averaged 82 percent of permitted. Reasons for this include:

- Limited agency funding to implement capital improvements and range developments.
- Voluntary and involuntary reductions in livestock numbers or seasons for resource protection or personal convenience.
- Permit waivers back to the government that were not re-issued, due to resource concerns or loss of a grazing season because of timing of re-issuance.
- Livestock markets and ranch economies reactions to changes in demand and competition.
- Recovery efforts for wildfire areas that included temporarily reduced grazing use.

Vacant Allotments - There are currently 12 vacant allotments. These allotments do not have associated Term Grazing Permits and have been ungrazed for several to many years. Some of these are within the Salt Lake and Davis County watersheds and were left vacant to protect public supply watersheds. Three of the Allotments in the Eastern Uintas Management Area were vacated in the past with the understanding that they would be left vacant to provide habitat for re-introduced bighorn sheep in cooperation with the State of Utah Division of Wildlife Resources. However, none of these allotments have been formally designated as closed. Prior to re-introducing livestock grazing to any of the vacant allotment areas, a site-specific analysis is required under the National Environmental Policy Act. The Alternatives in this FEIS include a range of options for vacant allotments from closing them all to maintain benchmark areas in ungrazed condition and provide habitat for bighorn sheep, to leaving them all open to be considered in the future for re-introduction of grazing after site-specific analysis. Appendix I displays the names, total allotment acreages, current status (vacant or active), and status by Alternative for all Allotments in the Wasatch-Cache National Forest.

Current Condition and Trend

Rangeland condition and trend is reported annually by Allotment. Where actual monitoring data is not available, condition and trend are to be estimated. Table RN-3 was presented in the DEIS and shows a summary of range conditions and trends, for years 1993 and 1999, of riparian and upland rangelands with Forest Plan management objectives.

Important Note: A review of these figures during development of the FEIS showed that reporting across the Forest has been uneven from Ranger District to Ranger District. Some Districts did not estimate condition or trend where no actual monitoring data was available. In order to develop estimates of forest-wide consequences of Alternatives, (in which acres in unsatisfactory condition are removed from “suitable” acres), we extrapolated from those Districts where monitoring had been conducted and estimates had been made. Forest-wide, a total of 16,200 capable acres of uplands and 2,100 capable acres of riparian were estimated to be “not meeting or moving toward” objectives (i.e. in unsatisfactory condition).

Table RN-3. Rangeland Condition and Trend

Setting	Status in Relation to Forest Plan Objectives	1993 Acres	1999 Acres
Riparian	Undetermined Condition	4,952	5,254
	Estimated Meeting	18,014	18,014
	Verified Meeting	488	748
	Estimated Moving Toward	1,355	977
	Verified Moving Toward	30	140
	Estimated Not Meeting	1,723	1,296
	Verified Not Meeting	150	120
	Total Acres w/ Management Objectives	21,760	21,295
Uplands	Undetermined Condition	232,421	109,317
	Estimated Meeting	150,827	337,931
	Verified Meeting	961	1011
	Estimated Moving Toward	28,176	37,778
	Verified Moving Toward	27,499	27,499
	Estimated Not Meeting	13,526	11,076
	Verified Not Meeting	400	400
	Total Acres w/ Management Objectives	221,389	415,695

Source: Forest Service RAMIS and INFRA databases

Rangeland Health Amendment Implementation

Key decision items from the 1996 Rangeland Health FEIS included utilization standards for rangelands in satisfactory condition, ground cover standards, a system for assigning riparian classes, and direction for establishment of key areas for monitoring utilization, riparian green-line status, and other indicators of rangeland health. The intent of the Rangeland Health Amendment management direction was to incorporate these standards for minimum ground cover and maximum utilization into Term Grazing Permits, and then to establish key areas and begin monitoring for utilization, condition, and trend at key areas within the allotments as soon as possible. Implementation of this direction has been accomplished in many but not all allotment areas.

Utilization Standards for Upland Vegetation Types in Satisfactory Condition - Currently, maximum utilization standards for satisfactory condition upland, aspen, and crested wheat-grass vegetation types have been incorporated into Term Grazing Permits. The 1996 Rangeland Health Amendment to the Forest Plan did not address rangelands in unsatisfactory condition.

Utilization Standards for Riparian Classes 1, 2, and 3 –Currently, these values have been assigned to 72 Wild and Scenic River candidate streams and rivers as a part of that inventory process (See Revised Forest Plan Appendix VII). Remaining streams still need to be classified and the accompanying standards implemented in those riparian areas.

Minimum Ground Cover Standards – These standards are expressed as a minimum acceptable percentage of what the potential undisturbed ground cover would be for various vegetation types (See Revised Forest Plan Appendix VII). Currently, the value for potential undisturbed ground cover has been established for a number of vegetation types from a few specific locations. More site-specific potentials may be developed in the future during Allotment Management Plan revisions.

Monitoring of Utilization, Condition, and Trend –Use of the Rangeland Health Amendment standards for monitoring is applied to designated "key species" located at designated "key areas" (FSH 2209.21). Key areas were established on all allotments on the Forest during the 1960's to assess conditions and to establish long-term trend studies. Most of these are still usable as key areas but validation to ensure these areas meet the current definition of a key area is a necessary step. The method for assessing rangeland vegetation and soil conditions in the 1960's (Parker 3-step) has been replaced with new methods (nested frequency). These new methods have been established on approximately 50% of allotments. Of these allotments, 80 % are currently being monitored for utilization and long-term condition trends. Of the allotments without validated key areas, 40% have been studied using other methods to determine conditions and long-term trends. The Revised Forest Plan includes an Objective specifically focused on improving rangeland grazing administration.

Environmental Consequences

Background

Needs For Change related to rangeland resources were identified in Chapter 1 of this document. Capable and suitable rangelands must be identified and forage production/potential outputs estimated. Restoration of rangelands in unsatisfactory condition and the risks of livestock/ wildlife disease transmission need to be considered in revised plan management direction. A number of allotments are currently vacant, bringing into question the future of these allotments. To address all of these needs, a range of potential modifications to Forest Plan direction are displayed in the Alternatives, and the effects of those potential modifications are analyzed in this section.

General Effects- Common to All Alternatives

This section addresses how various types of management direction and activities can affect livestock grazing in terms of rangeland capability, suitability, and productivity. The general effects described here are, for the most part, common to all of the alternatives.

Forest Plan Direction and Implementation

Building upon the 1996 Wasatch-Cache National Forest Rangeland Health Forest Plan Amendment, Forest Plan revision management direction for all alternatives has been developed to maintain or improve rangeland conditions on National Forest administered lands. Direction occurs at both the Forest-wide and Management Area levels. Goals and objectives have been designed to achieve desired rangeland conditions over the long term, and to maintain or restore sustainable levels of forage production, livestock use, and ecosystem functions and processes. Furthermore, management direction for other resource programs—such as vegetation, soil, water, riparian, aquatic, wildlife, and recreation—provide additional guidance and resource protection in an integrated manner.

For the 5% estimate of capable areas where present rangeland conditions are not meeting objectives, conditions are expected to improve under all alternatives with full implementation of Forest Plan management direction. However, the rate of improvement will vary by alternative.

Grazing Permits and Administration

Livestock use and its associated activities are allowed on open Allotments under the Term Grazing Permit system, within all Management Prescription Categories except in Research Natural Areas (prescription 2.4) and Developed Recreation Areas (prescription 4.5). The authority to protect, manage, and administer National Forest System lands for range management must be in accordance with the terms and conditions specified in Parts 1 through 3 of the term grazing permit issued for a specified area. Grazing administration responsibilities do not vary by alternative, as they are determined by existing policy (FSM 2230) and annual budget priorities. However, recognizing that some areas of the Forest are in unsatisfactory condition, the Revised Forest Plan includes an Objective focused specifically on improving grazing administration to restore these lands to satisfactory conditions.

Capable Rangelands

Capable rangelands are accessible to livestock, produce forage or have inherent forage-producing capabilities, and can be grazed on a sustained yield basis, under typical and reasonable management practices. Capable rangeland acres are the same for all alternatives (see Table RN-1). However some forested lands, if affected by timber harvest or fire, may become accessible and can produce forage. Forage may be produced for 10 or more years before vegetation changes terminate available production or accessibility. These lands are classified as transitory range and are not a part of the capable base. Transitory range is discussed further below under the Effects sections for timber harvest, vegetation/fuels treatments, and fire management.

Suitable Rangelands

Suitability is defined as “the appropriateness of applying certain resource management practices to a particular area of land as determined by an analysis of the economic and environmental consequences and alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.” (FSM 1905) Once capability is determined (see

section titled Rangeland Capability under the Affected Environment section earlier in this Chapter), an assessment of suitability by alternative is conducted to address whether livestock grazing is, or is not, compatible with management direction for a management area's other uses and values, and which if any, other uses would be foregone with livestock grazing. Using the Intermountain Region Protocol: Rangeland Capability and Suitability Determinations for Forest Plan Revisions (USDA Forest Service 1998b) criteria were reviewed and tailored to local conditions for a suitability assessment. Appendix B-9 provides a discussion of suitability criteria used in this analysis and each of the alternatives includes a determination of rangeland suitable acres.

The Forest has been analyzed for being suitable to grazing and browsing (to include wildlife) as required in 36 CFR 219.20. This analysis considered other uses or values of the area. All lands, with the exception of talus slopes, water and rock, are suitable for grazing and browsing by wildlife. Suitable range expected to be used by wildlife is the same for all alternatives.

Criteria for rangeland suitability evaluation for livestock grazing include several that apply to all alternatives while other criteria vary by alternative. Existing and proposed Research Natural Areas (RNA's) and/or RNA additions are not considered suitable rangelands in any alternative. Also, existing administrative sites and developed recreation sites are not considered suitable, due to the incompatibility of uses. Given that livestock already do not graze these areas, their subtraction from suitable acres has no effect on current levels of grazing.

Rangeland Forage Productivity

In many cases, when shrub vegetation communities are moved to younger age classes, productivity for grazing herbivores may increase. A "flush" of forbs and graminoids often follows wildland or prescribed fire, and in some cases emergency recovery activities will actually establish a grass cover to protect soil productivity and watersheds from damage following severe wildfires. Productivity increases can be especially dramatic when older age-class sagebrush and other mountain brush types are impacted by wildland or prescribed fire. The increase in grass and forb production in these cases can last for many years or even decades. The magnitude of these increases in productivity will depend directly on site-specific conditions as well as the potential for wildland or prescribed fire to occur under a given alternative. For the purposes of this analysis, we assume a similar likelihood of unwanted wildland fire in these vegetation types for all of the alternatives.

Direct and Indirect Effects by Alternative

Rangeland Suitability.

Determination of rangeland capability is an assessment of an area's ability to provide forage and water for livestock use. In contrast suitability is an assessment of an area's potential conflicts with other resources (alternative uses) and how to resolve them. Capable rangelands within grazing allotments were analyzed using different criteria for grazing suitability by alternative. This analysis considered other uses or values of the area (economic and environmental consequences and alternative uses foregone) and identified areas where grazing may not be

appropriate. Table RN-4 displays total acres of capable rangelands, capable acres within grazing allotments, and the acres subtracted based on suitability criteria by alternative. Some lands within the Forest are incompatible with domestic livestock grazing or do not allow grazing due to alternative uses foregone. These (RNAs, developed recreation sites) were discussed above and are common to all alternatives.

Table RN-4. Rangeland Suitability Acres by Alternative (numbers rounded to the nearest 100)

Criteria	Alt1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Forest Capable Acres [1]	369,900	369,900	369,900	369,900	369,900	369,900	369,900
Capable Acres Within Open (Active and Vacant) Allotments [1]	302,700	302,700	302,700	302,700	302,700	302,700	302,700
Developed Recreation Sites Within Open Allotments Subtracted [1]	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700
Remaining Capable Acres Within Open Allotments	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Capable Acres Within Vacant Allotments Closed for Maintaining Resource Conditions Subtracted[2]	-10,400	-10,400	0	0	0	0	-2,500
Capable Acres within Vacant Allotments Closed For Bighorn Sheep Subtracted [3]	-7,800	-7,800	0	0	0	-7,800	-7,800
Uplands Acres Not Meeting FP Objectives Subtracted[4]	-16,200	-16,200	0	0	0	-16,200	0
Riparian Acres Not Meeting FP Objectives Subtracted [4]	-2,100	-2,100	-2,100	0	0	-2,100	0
Acres for Cutthroat Trout Management Subtracted[5]	0	-26,000	0	0	0	0	0
Total Suitable Acres	263,500	237,500	297,900	300,000	300,000	273,900	289,800
Percent of Total Capable Within Open Allotments After Developed Recreation Sites Are Subtracted	87.0%	78.5%	98.4%	99.1%	99.1%	90.5%	95.7%

[1] Information from Forest Corporate GIS database
[2] Alternatives 1 and 2 close all vacant allotments and Alternative 7 closes those vacant allotments (Clegg, Hardscrabble, Mill Canyon, Shingle Mill and Wright) within the Salt Lake and Davis County watersheds for general watershed condition maintenance
[3] Vacant allotments (Burro Peaks, Thompson Peak, and West Beaver) closed for bighorn sheep health purposes. This would reduce suitable acres by 7,800 acres. In addition, Alternatives 1, 2, and 6 allow for the closure of Gilbert Peak, Henry's Fork-Hessie Lake, & Red Castle allotments should those permits be voluntarily waived without preference. This would reduce suitable acres by an additional 9,500 acres. Alternative 7 allows for these, as well as East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater allotments to be closed if permits are voluntarily waived without preference. This would reduce suitable acres by another 9,800 acres, should all these permits be waived.
[4] Information extrapolated from monitored areas (INFRA database) and applied forest-wide.
[5] Entire watershed acres removed within allotments with both known cutthroat trout populations and reported riparian acres in unsatisfactory condition.

A determination of suitability by alternative was completed to address whether or not livestock grazing is compatible with other uses and management direction identified in each alternative and uses that would be foregone with livestock grazing. This suitability determination excluded lands outside open allotments (both active and vacant) because alternative uses forgone were addressed in the past to a large degree, as well as in the 1985 Forest Plan. Domestic livestock

have been removed from culinary and other municipal watersheds to maintain water quality, from developed recreation sites to avoid conflicts and to maintain human health, safety of livestock, and Research Natural Areas (RNAs) to protect the values for which these areas were established. Because no new developed recreation sites have been identified through this Forest Plan revision, and because proposed RNA expansions are outside existing allotments, no additional conflicts were noted for these considerations. As noted in Table RN-4, all alternatives remove 2,700 acres of developed recreation sites currently within open allotments leaving a total of 300,000 capable acres.

Vacant Allotment Disposition- Alternatives 1 and 2 remove 10,400 capable acres by closing all vacant allotments to maintain ungrazed resource conditions, and protect watersheds. These Alternatives also close 7,800 capable acres in the Eastern Uintas Management Area for bighorn sheep habitat. Alternative 6 closes only the vacant allotments for bighorn sheep habitat (7,800 capable acres). Alternative 7 closes vacant allotments in Salt Lake and Davis Counties (2,500 capable acres) for watershed protection, and 7,800 capable acres in the Eastern Uintas Management Area for bighorn sheep habitat. Alternatives 4 and 5 retain vacant allotments for future site-specific evaluation.

Unsatisfactory Condition Lands Disposition- Alternatives 1, 2, and 6 remove 16,200 acres of uplands and 2,100 acres of riparian areas in unsatisfactory condition (i.e. not meeting or moving toward objectives) to restore these lands. Alternative 2 also removes 26,000 acres from watersheds with both known Bonneville and Colorado River cutthroat trout and unsatisfactory riparian conditions. Alternative 3 removes only the 2,100 acres of unsatisfactory condition riparian areas for restoration. Alternative 7 retains capable acres in unsatisfactory condition as suitable, but adds a guideline for lower forage utilization (30-40% rather than 50%) on these areas to restore these lands. Alternatives 4 and 5 retain all capable acres except those within developed recreation sites as suitable.

Effects of Suitability Determinations

Closure of vacant allotments provides ecological benefits including maintenance of watersheds, maintenance of ungrazed resource conditions for benchmarks, and reduced risk of disease transmission from domestic sheep to bighorn sheep. Given that the Allotments are currently vacant, there is no immediate or direct effect on permittee operations or community economies from these allotment closures. It is also important to note that experienced budget levels in recent years have been inadequate to complete site-specific analyses on active allotments, making vacant allotments an even lower priority for analysis. Even in alternatives where vacant allotments are left open, it is highly unlikely that resources would be available to conduct the required site-specific analysis for re-introducing livestock grazing. Therefore, the short-term on-the-ground consequences of these alternatives would be similar to closure- i.e. the vacant allotments would remain in ungrazed condition. Given this, closure of vacant allotments is considered only as a long-term effect. Alternatives 1 and 2 provide the most long-term ecological benefit closing all vacant allotments. Alternative 7 provides somewhat less long-term ecological benefits than 1 and 2 because it focuses closures only on Salt Lake and Davis County watersheds and on the bighorn sheep habitat in the Eastern Uinta Mountains Management Area. Alternative 6 provides the long-term benefits for bighorn sheep habitat but not for the other

vacant allotment areas. Alternatives 3, 4, and 5 do not close vacant allotments thus not providing for long-term benefits although as explained above, short-term the allotments would likely continue to remain in ungrazed condition accruing those benefits for the short-term.

Effects of **removal of areas in unsatisfactory condition** from suitable acres would vary because of site-specific factors. Areas in unsatisfactory condition that can be easily avoided through livestock herding, and/or salting would be most likely to improve in ground cover and species composition over the long-term. Areas that are fenced or can be fenced would also be likely to improve if removed from livestock grazing. Areas in unsatisfactory condition that are relatively small, scattered, or in locations where it is difficult to avoid grazing without expensive structural improvements (fence construction) would be much less likely to improve. Given that acres for this analysis were extrapolated forest-wide from areas with monitoring, the relative proportions of the above conditions are unknown. There would likely be a range of improvement probability that can only be predicted with site-specific assessment. Alternatives 1, 2, and 6 would result in this range of improvement on a total of 18,300 upland and riparian acres and Alternative 3 would result in 2,100 acres with a range of improvement on riparian acres.

Alternative 7 (and the Revised Forest Plan) includes a **forage utilization guideline** for lower (30-40%) allowable use on areas in unsatisfactory condition rather than removing these areas from suitability. Recent literature (Holechek, et al. 2001, Holechek 1988) indicates that sagebrush grasslands, mountain shrublands, oak woodlands, and pinyon-juniper woodlands can receive 30-40 percent utilization. Holechek, et al.(2001) noted that rangelands in poor (unsatisfactory) condition should receive the lower utilization level when grazed during active forage growth. With implementation of this Guideline, areas of both upland and riparian vegetation in unsatisfactory condition would improve with riparian areas restored more quickly than uplands. Improvement would be more consistent overall than in Alternatives 1, 2, 6, and 3 because a lower utilization standard could be applied to all the areas more easily than total avoidance of the areas. However, even this approach's success will depend on diligence in herding, salting, range improvement maintenance, and monitoring of utilization.

Alternatives 4 and 5 do not remove areas in unsatisfactory condition nor do they implement a lower forage utilization allowance for these areas. Some improvement of these areas is expected through implementation of management direction from the 1996 Rangeland Health Amendment, however it is expected that it would be more gradual and less consistent than in any of the other Alternatives.

Potential <u>Future</u> Changes in Suitable Acres- In addition to the closure of vacant allotments in the Eastern Uintas Management Area (Burro Peaks, Thompson Peak, and West Beaver) for bighorn sheep habitat, Alternatives 1, 2, and 6 allow for the future closure of Gilbert Peak, Henry's Fork-Hessie Lake, & Red Castle allotments should those permits be <u>voluntarily</u> waived without preference. This would reduce suitable acres by 9,500 acres. Alternative 7 allows for these, as well as East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater allotments to be closed if permits are <u>voluntarily</u> waived without preference. This would reduce suitable acres by 9,800 acres (for a total of 19,300 acres) with the associated benefit being reduced risk for disease transmission from domestic sheep to bighorn sheep as well as watershed protection and establishment of ungrazed benchmarks. Given that this would be

based strictly on a voluntary action initiated by permit holders, net effects on permittee operations would be expected to be positive. (Otherwise the permittee could choose not to take this action). These wildlife and ungrazed resource condition values are foregone in Alternatives 3, 4, and 5.

Estimated Grazing Outputs

For the following discussion, a distinction must be made between outputs and permitted numbers. The NFMA requires projections of outputs generally expressed as Animal Unit Months (AUMs). Decisions made in the Forest Planning process do *not* include issuance of Term Grazing Permits nor do they include decisions about stocking of allotments (i.e. permitted numbers). These decisions must be based on very specific site-dependent information and are made through either Allotment Management Planning or Term Permit Issuance or Modification. Therefore, the projections displayed here are for outputs only. Permitted number changes are dependent on other decision-making processes.

For the 10-year period 1991 to 1999, grazing outputs as AUMs ranged from a high of 69,919 to a low of 30,198. While it is recognized that actual use can vary as displayed in Table RN-2, and that permitted numbers have been consistently higher than actual use, the averages of actual use have been used in this analysis to estimate outputs. These estimates are more realistic than either the high or the low ends of the range observed over the last 10 years or the total permitted numbers.

With an average of 58,900 AUMs (rounded from Table RN-2) produced during that period on approximately 281,850 (rounded) suitable acres, the average acres per AUM were approximately 4.78. (Suitable acres were adjusted for these calculations to exclude the 18,152 acres in vacant allotments. These do not currently produce outputs nor are they expected to within the planning period.) Suitable acres by alternative along with this average AUM output per acre have been used in this analysis to estimate grazing outputs by Alternative shown in Table RN-5.

Implementation of the removal of capable acres in unsatisfactory condition from grazing in Alternatives 1, 2, 3, and 6 may or may not result in an actual reductions in livestock numbers but are projected to reduce outputs. This is because diligent herding, salting, range improvements, and adjustments to seasons of use may be employed to remove grazing from these areas with the same or reduced numbers of livestock. In Alternative 7, outputs are projected at a reduced level for those acres in unsatisfactory condition proportional to the reduced allowable utilization of 30-40% (compared to 50% allowed on all other suitable acres). FEIS Appendix B-9 displays calculations for these outputs. In Alternatives 4 and 5, outputs are expected to be similar to the average of the last 10 years because no areas are removed from grazing and forage utilization is allowed at current levels (50%) from the 1996 Rangeland Health Amendment. Effects of these output changes on economic and social conditions are discussed in the Social and Economic Effects section later in this FEIS.

Table RN-5. Estimated Authorized Livestock Grazing Outputs by Alternative

Livestock	10-Year Average AUMs [1]	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 [2]
Suitable acres	281,850	263,550	237,550	279,750	281,850	281,850	263,550	281,850
Cattle	34,300	31,980	28,820	33,940	34,180	34,180	31,980	33,560
Sheep	24,600	23,160	20,870	24,580	24,750	24,750	23,160	24,300
Total	58,900	55,140	49,690	58,520	58,930	58,930	55,140	57,860

Numbers are rounded to nearest 10. Cattle are 58 percent of total AUMs; Sheep are 42 percent of total AUMs

[1]Average Authorized AUMS
[2] For Alternative 7, 4.78 acres/AUM on satisfactory range, 6.70 acres/AUM on unsatisfactory range, for all other Alternatives, 4.78 acres/AUM on all suitable acres.

Effects on Grazing from Timber Harvest

In many cases, when plant communities are moved to younger age classes, productivity for grazing herbivores will be increased temporarily. A “flush” of forbs and graminoids can accompany vegetation management activities such as timber harvest depending on a number of site-specific factors. The type of harvest, degree of overstory removal, treatment of slash, and individual site productivity or habitat type affect the degree to which increases in forage production may occur. Treatment areas can result in some increase in forage production. While livestock can use this, suitability is not altered because of the transitory nature of such increases. Use of these areas may improve distribution of livestock grazing in other areas resulting in less forage utilization, less reduction in ground cover, and less likely changes in species composition from livestock grazing. The forest-wide nature of this analysis does not allow us to identify exactly where these actions would take place, but over a 10-year period aspen and/or conifer treatment would be approximately 15,500 acres in Alternative 5; 13,000 acres in Alternative 4; 7,500 acres in Alternative 3; 6,500 acres in Alternative 2; 5,000 acres in Alternatives 6 and 7; and no acres in Alternative 1. These relative acreages provide an estimation of the magnitude of the effects described for timber harvest.

Effects on Grazing from Vegetation/Fuels Treatment

Regardless of alternative, fuels treatments (primarily in oakbrush in the wildland urban interface) would have a minimal effect, if any, on livestock grazing. The removal of woody fuels to reduce fire hazard can potentially increase forage production for a short period, but is not expected to increase overall or long-term grazing capacity. In addition, fuels management will not require the removal of livestock from areas for any extended period of time and, therefore, will not require a reduction in livestock numbers during treatment.

Effects on Grazing from Recreation

Effects on livestock grazing from recreation activities do not vary by alternative because the primary differences in alternatives for recreation are in winter motorized/nonmotorized allocations which have no relevance to livestock grazing operations. As described in Effects Common to All Alternatives, domestic livestock grazing is prohibited in developed recreation sites under all alternatives. Many but not all developed recreation sites are fenced to exclude livestock grazing. There are approximately 2,650 (rounded to 2,700) acres of developed recreation sites in existing allotments and these acres are removed from suitable range Table RN-4). Currently Annual Operating Plans for livestock grazing direct permittees to manage livestock to avoid these areas. As recreation increases on the Forest along with population growth, there is expected to be an increased amount of interaction between undeveloped recreation uses and livestock. Effects include potential changes in livestock distribution in areas within allotments and heavily used for undeveloped recreation (such as along road corridors where camping and/or fishing occur and where ATV users create new routes that are adopted by others). Recreationists are known to leave gates open and this may result in livestock movement into areas where rest is planned. Complaints to the Forest Service and permit holders from recreationists who do not like the looks, sounds, and smells of livestock grazing along trails and other popular recreation attractions are expected to continue and may increase as recreation user densities increase. However, none of these effects are expected to vary by alternative in this Forest Plan Revision. Some motorized recreation users are expected to complain because livestock grazing permits often include allowance for motorized access to maintain fences and water developments while the general public is not allowed motorized access to the same areas. This would likely be the most frequent under Alternative 1 because of motorized trails closed to public access within areas recommended for Wilderness. Other Alternatives would show little relative difference in this effect.

Effects on Grazing from Wildlife Management

Discontinuing domestic sheep grazing in overlapping areas used by domestic sheep and bighorn sheep in the Eastern Uinta Mountains and Western Uinta Mountains Management Areas would reduce the risk of disease being transmitted from domestic to bighorn sheep. Alternatives 1, 2, 6, and 7 remove 7,760 capable acres from suitable range by closing the three currently vacant allotments (Burro Peaks, Thompson Peak, and West Beaver) to reduce disease risks (Table RN-4). Since these allotments are already vacant, there is no direct effect on current grazing operations or outputs. There is an indirect effect on potential future grazing outputs because these allotments would not allow potential future stocking with domestic livestock.
In addition to the vacant allotments above, Alternatives 1, 2, 6 and 7 would discontinue domestic sheep grazing on three sheep allotments (Gilbert Peak, Henry's Fork-Hessie Lake, and Red Castle) that overlap current bighorn sheep habitat *if* permits were *voluntarily* waived without preference. This would reduce suitable acres by an additional 9,500 acres for a total reduction of 17,300 capable acres. Alternative 7 would extend the area protected further for bighorn sheep to four additional allotments (East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater) immediately to the west, again *if* those permits were *voluntarily* waived without preference reducing suitable acres by about 9,800 acres for a total of 27,100 acres. Subtraction of these areas from suitable rangelands would have a long-term effect on overall potential

grazing outputs for domestic sheep. Because this action would be a result of a voluntary choice made by individual permit holders, it is expected that before they would take such an action, they would have weighed the potential impacts to their operations and identified a net benefit. Otherwise they would not likely choose to take this action.

Desired future conditions for vegetation developed in the 1996 Rangeland Health Amendment and described in the Revised Forest Plan as well as those to be developed site-specifically for individual grazing allotments take wildlife habitat needs into account. To achieve these conditions, grazing standards and guidelines are also contained in the Revised Forest Plan. Compliance with these will have some effects on livestock grazing operations in the form of required monitoring of utilization, and movement or removal of livestock when utilization standards are reached.

Effects on Grazing from Aquatic and Semi-aquatic Species Management

Alternative 2 removes approximately 26,000 acres of 6th order watersheds within seven allotments (Blacks Fork, Gilbert Creek, Logan Canyon, Middle Fork, Poison Mountain, Walker and West Fork Smiths Fork) from the suitable range acres. These watershed have both existing populations of Colorado River or Bonneville cutthroat trout and at least 20 acres of riparian acres identified in the INFRA database as either estimated or verified as not meeting Forest Plan objectives. Effects on livestock grazing in these allotments would be a net reduction in stocking during allotment management plan revisions for these allotments to allow for rehabilitation of theses watersheds. Stocking could be increased upon achievement of site-specific objectives developed to meet needs for these fish populations. No other alternatives remove entire portions of watersheds within allotments.

In Alternatives 1, 2, 3, and 6 about 2,100 acres of riparian habitat not meeting objectives are subtracted from suitable grazing acres to achieve rehabilitation of these areas. This will result in the need for increased herding, salting, and/or fencing of these areas to prevent livestock grazing. Without site-specific information the exact needs for each area are not known. However any of these needs will result in some increase in cost of operations to permit holders either in the form of personnel to herd or costs of fence construction and maintenance. In Alternative 7 only, rehabilitation of these riparian areas is achieved through implementation of a lower forage utilization allowance (30-40% rather than 50%) on the areas. This will require monitoring and movement of livestock upon reaching the lower utilization. Effects on grazing operations will vary depending on site-specific conditions from increased need for herding to possible early removal of livestock from these areas if forage utilization cannot be redistributed to other parts of the allotment. Effects on grazing are expected to be somewhat less than with Alternatives 1, 2, 3, and 6. Alternatives 4 and 5 mitigate grazing impacts to aquatic and semi-aquatic species management on a case-by-case basis as needs are identified site-specifically having the least short-term effect on grazing. However, long-term these alternatives may result in greater pressure to remove grazing because of the slow progress in rehabilitating unsatisfactory aquatic and semi-aquatic habitats.

Effects on Grazing from Soil and Water Resource Management

Closure of vacant allotments is considered a long-term beneficial effect for watershed protection. Alternatives 1 and 2 provide the most long-term benefit closing all vacant allotments. Alternative 7 provides somewhat less long-term benefits than 1 and 2 because it focuses closures only on Salt Lake and Davis County watersheds and on the bighorn sheep habitat in the Eastern Uinta Mountains Management Area. Alternative 6 provides the long-term benefits of vacant allotment closure for bighorn sheep habitat but not for the other vacant allotment areas. Alternatives 3, 4, and 5 do not close vacant allotments thus not providing for these long-term benefits. However because of limited resources available to complete site-specific analyses required for re-stocking, these allotments would likely continue to remain in ungrazed condition accruing those benefits for the short-term.

Reducing or removing livestock grazing from uplands and riparian areas not meeting Forest Plan objectives (desired conditions) is prescribed to allow for relatively more rapid and more certain recovery of soil and watershed conditions. Alternatives 1, 2, 6, and 7 remove 16,200 acres of uplands and 2,100 acres of riparian areas not meeting or moving toward Forest Plan objectives from grazing suitability. The effect on grazing will vary depending on site-specific conditions. Alternative 2 also removes 26,000 capable acres for cutthroat trout habitat/watershed improvement. Alternative 3 removes 2,100 acres of riparian areas from grazing suitablility. Effects on grazing from these removals of areas will vary depending on site-specific factors. Areas that can be easily avoided through livestock herding, and/or salting would only require that increase in personnel and effort. Areas that must be fenced would require both the cost of fence construction and on-going maintenance that can be substantial. Areas that are relatively small, scattered, or in locations where it is difficult to avoid grazing would be an on-going problem for grazing operations and are much less likely to improve. Given that acres for this analysis were extrapolated forest-wide from areas with monitoring, the relative proportions of the above conditions are unknown. There would likely be a range of costs to grazing operations that can only be predicted with site-specific assessment. Alternatives 1, 2, and 6 would result in this range of costs for a total of 18,300 upland and riparian acres and Alternative 3 would result in 2,100 acres with a range of these costs for operations on riparian acres.

Effects on Grazing from Special Designations

There would be no effect on livestock grazing from special designation areas. Proposed Research Natural Areas additions are outside existing allotments. In addition, areas proposed as Special Interest Areas with portions in existing allotments, were identified where existing livestock grazing would not affect the values of those areas and where designation would not effect the ability to continue existing grazing practices.

Effects on Grazing from Fire Management

Prescribed fire within active allotments would require one year of rest prior to prescribed fire use and generally two additional years to achieve desired conditions following prescribed fire. This would ensure that successful regeneration of the shrub and tree layers occurs where aspen regeneration is a critical component. The effects of this required rest on grazing operations will

vary depending on the site-specific location of burn units in relation to allotment pastures and depending on timing of the burns across a given landscape. In most cases pasture rotations and/or riding and herding can be used to control livestock use of the burned units. This may require a temporary change in the grazing system including shortened seasons of use and or intensified livestock management that will effect grazing operations. At the same time, prescribed fire is expected to increase forage production in aspen and sagebrush communities and to increase the amount of transitory range in areas where conifers are temporarily removed from the overstory. This means that for areas burned later in the decade, the areas already burned and recovered can provide forage that will hold livestock longer which may allow for more normal seasons of use and less need for intensive herding. The relative magnitude of these effects is directly related to the number of acres and vegetation cover types treated with prescribed fire in a given alternative.

For the aspen and aspen-conifer vegetation types, Alternative 2 treats the most of any alternative with approximately 8,000 acres per year (Table VEG-4). Alternatives 3, 6 and 7 treat approximately 3,200 acres of these types per year and Alternatives 4 and 5 treat approximately 720 acres per year. Alternative 1 does not allow prescribed fire and would treat no acres. While not all of these aspen treatment acres are likely to be in active allotments, where they are, livestock grazing will be limited until aspen reach an average height of 6 feet. As forage production increases following treatment, permitted livestock numbers would not increase because of the transitory nature of these increases. Over the longer term, and later in the decade, authorized numbers may trend more toward permitted numbers in relative proportion to acres treated through fire, and range conditions would likely improve because of better distribution and lighter use on available forage.

A majority of the sagebrush vegetation types have high shrub canopy cover because of fire suppression and/or heavy grazing pressures in the past. As a result forage production is depressed below potential for the sites. Prescribed burning of sagebrush types will require pre- and post treatment exclusion of grazing to both build up fine fuels and assure establishment of a forb-grass under-story. Once established, however, sustained utilization of the increased browse can occur for many years, creating the potential for increases in total forage available. The magnitude of the increase will be proportional to the amount of sagebrush and mountain brush type vegetation treatments by alternatives. Alternative 2 treats the most with approximately 4,000 acres of sagebrush and/or pinyon-juniper per year (Table VEG-4); Alternative 7 treats 3,000 acres per year; Alternatives 3 and 6 treat 2,000 acres per year; Alternatives 4 and 5 treat 1,000 acres, and Alternative 1 treats no acres. Most but not all of these sagebrush and pinyon-juniper acres are likely to be in active allotments. As forage production increases following treatment, permitted livestock numbers would not increase because of the transitory nature of these increases. However authorized numbers may trend more toward permitted numbers in relative proportion to the acres improved. And, like the aspen communities, range conditions would likely improve because of better livestock distribution and lighter total use on available forage.

Effects on Grazing from Management of Recommended Wilderness

There is no direct effect on grazing or livestock operations from interim management of those areas recommended for wilderness. Motorized access associated with grazing in these areas would continue to be authorized in term grazing permits, until such time Congress acts on these wilderness recommendations. There may be some indirect effect on grazing operations in the form of complaints from recreationsists who believe grazing should be curtailed or eliminated in areas recommended for wilderness.

Cumulative Effects

The area of consideration for cumulative effects for rangeland use is the entire Bear River Range (both Wasatch-Cache and Caribou National Forests), the Wasatch Range, including the Wellsville Mountains south to the Mount Nebo area (Wasatch-Cache and Uinta National Forests) and the Uinta Mountains (Wasatch-Cache and Ashley National Forests). Figure RN-1 shows the area currently occupied by open range allotments (both active and vacant) on these forests. There is additional grazing on adjacent lands administered by the Bureau of Land Management as well.

Many grazing permit holders depend on allotments administered by the Forest Service and Bureau of Land Management to provide a portion of their year-round grazing operations. The Wasatch-Cache National Forest will continue to play a role in supporting livestock operations. Overall, a slight decline in the demand for livestock grazing can be expected over the life of this plan (short term), as private land development, higher property values, and conflicts between livestock operations and adjacent urban recreation uses increase.

Over the last two decades, there has been a decline in the actual use of forage authorized under term grazing permits. This trend is expected to either plateau or continue. Livestock operation costs are expected to continue rising, and livestock market price fluctuations—in what has become an international market—will continue to occur. As result, operation economies of scale will likely become more important. The number of small livestock operators may become fewer in number, as base properties or livestock are sold for financial reasons or if younger generations choose other occupations. As a result, the number of grazing permit holders on the Forest could become fewer. The remaining permit holders could potentially have larger livestock holdings and greater numbers of permitted livestock. The combining of some allotments could occur as a part of this process, thus increasing the number of pastures available for use during the grazing season. This situation would allow for greater seasonal management flexibility and shorter pasture grazing durations. To achieve a sustainable level of forage production and properly functioning conditions under any alternative, a significant amount of sagebrush will need to be brought to younger age classes by treatment. Otherwise, livestock forage production can expect further declines with the continued declines in sagebrush under-story vegetation.

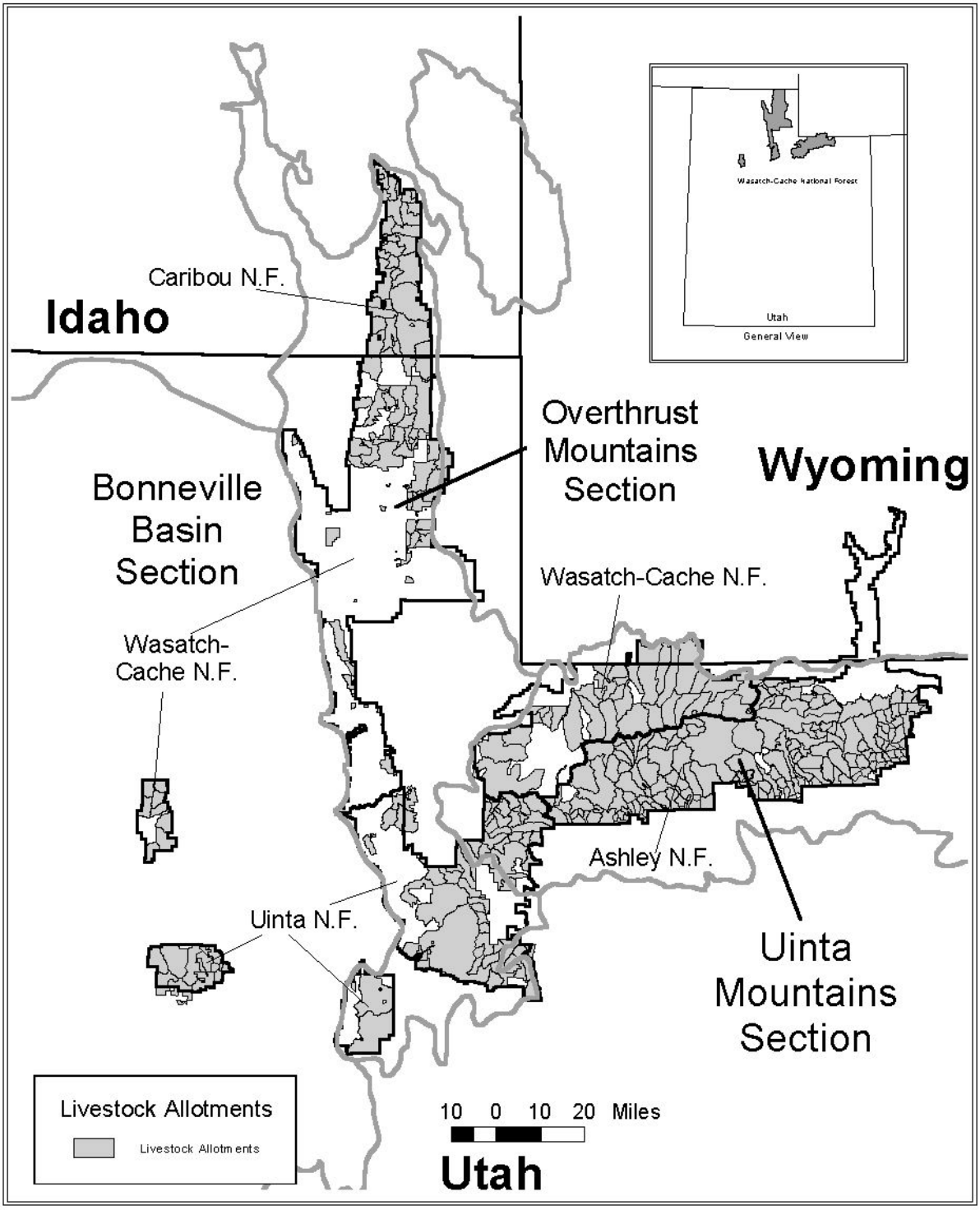


Figure RN-1. Open Allotments (Active and Vacant) on the Caribou, Wasatch-Cache, Ashley, and Uinta National Forest portions of the Bonneville Basin, Overthrust Mountains, and Uinta Mountains Ecological Sections.

There will likely be a net loss of open space and in some cases, a loss of big-game winter and spring ranges, as ranches are sold and subdivided. These conditions will likely continue to occur in Cache, Summit, and Tooele Counties. Morgan and Rich Counties could experience this situation to a lesser extent, depending on the level of recreation and second home growth experienced. As a result, marginal winter habitat may be used more frequently by big game, which may increase localized competition between livestock and wildlife on private lands.

Uinta Mountains. The Wasatch-Cache, Ashley, and Uinta National Forests currently manage approximately 1.7 million acres within the Uinta Mountains Subsection. Of these acres, approximately 95 percent are currently in open allotments (88 percent in active, open allotments). The Wasatch-Cache National Forest currently has nearly 509,000 acres of open allotments in the Uinta Mountains portion of the Forest. Of these, just less than 465,000 acres are currently active, while nearly 44,000 acres are currently vacant. These vacant allotments would be closed in Alternatives 1, 2, 5, 6, and 7, but would remain open in Alternatives 3 and 4. In addition about 39,000 acres of allotments would be closed only if permits are voluntarily waved without preference in Alternatives 1, 2, and 6 and nearly 130,000 acres in Alternative 7. The Ashley National Forest currently has over 960,000 acres of their portion of the Uinta Mountains in open allotments (slightly more than 890,000 acres in active, open allotments and an additional 70,000 acres in open, but vacant allotments). The Uinta National Forest has 166,000 acres of active, open allotments on the Uinta Mountains portion of the Forest.

Wasatch Mountains (including the Bear River Range and Wasatch Range). The Caribou, Wasatch-Cache and Uinta National Forests currently manage over 1.4 million acres within the Wasatch Mountains Subsection. Of these acres, approximately 69 percent are currently in open allotments. The Wasatch-Cache National Forest currently has about 306,000 acres of open allotments in the Wasatch Mountains portion of the Forest. Of these, 300,000 acres are currently active, while nearly 6,000 acres are currently vacant. These vacant allotments would be closed in Alternatives 1 and 2, but would remain open in Alternatives 3-7. The Caribou National Forest currently lists about 260,000 acres of their portion of the Bear River Range in open allotment. They did not distinguish the active vs. vacant allotments. The Uinta National Forest has more than 414,000 acres of open allotments (402,000 acres active, open and 12,000 acres open, but vacant) on the Wasatch Mountains portion of the forest.

Bonneville Basin. The Wasatch-Cache and Uinta National Forests currently manage approximately 216,000 acres within the Bonneville Basin Subsection. Of these acres, approximately 69 percent are currently in open allotments. The Uinta National Forest currently has nearly 100,000 acres of active open allotments on the Bonneville Basin portion of the Forest. The Wasatch-Cache National Forest currently has about 48,000 acres of open allotments in the Bonneville Basin portion of the Forest of which nearly 42,000 acres are currently active, while slightly more than 6,000 acres are currently vacant. These vacant allotments would be closed in Alternative 1 and 2, but would remain open in Alternatives 3-7.

Effects of Activities on Livestock Grazing. In the past, activities such as fire, timber harvest, recreation development and uses, and range improvements have all affected the ability of livestock to graze on the forest and the quality of forage. Fire in tree-dominated plant communities and timber harvest temporarily increased available forage for livestock use,

creating “transitory range”. These activities removed the overstory, which typically increased the production of forage in the understory. Fire in sagebrush and other rangeland plant communities also temporarily increased forage production in these stands. Because of fire suppression, many rangelands now have reduced productivity. More recently, with the use of prescribed fire on a very limited basis, some sagebrush communities have increased their productivity; at least until the sagebrush density again competes with the herbaceous component. In the 1960’s the Forest Service took many actions, including herbicide use, plowing, and seeding in sagebrush and juniper or pinyon-juniper stands to increase forage specifically for livestock production.

Topic 8 – Special Designations

Introduction

Special designations refer to areas identified in this forest planning process, with values that could require specific management direction to enhance, recognize, or protect those values. Four kinds of potential designations are covered in this special designations section. These include Research Natural Areas (RNA's, Management Prescription Category (MPC) 2.4), Special Interest Areas (SIA's, MPC 2.7), and Wild and Scenic Rivers (MPCs 2.1-2.3). This special designations section does not include Wilderness (MPCs 1.1-1.4), recommended wilderness (MPC 1.5), undeveloped areas (MPC 2.6) or scenic byways (MPC 2.5). These are considered within other sections of this document.

Laws, Policy and Direction

Each of the categories of allocation within special designations has its own set of legal, regulatory or policy direction.

Research Natural Areas

36 CFR 219.25 - states that forest planning shall provide for the establishment of RNAs. To be identified are examples of important forest, shrubland, grassland, alpine, aquatic, and geologic types that have special or unique characteristics of scientific interest and importance and that are needed to complete the national RNA network.

Forest Service Manual, Title 4063 - provides specific direction concerning establishment and management of RNA's.

Special Interest Areas and Special Areas

Special Interest Areas are meant, "to protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. To classify areas that possesses unusual recreation and scientific values so that these special values are available for public study, use, or enjoyment" (FSM 2360.2). These areas are designated by law, or may be designated administratively, as special interest areas. Areas so designated are managed to emphasize specific related values. Other uses are permitted in the areas to the extent that these uses are in harmony with the purpose for which the area was designated.

Special Areas are meant, "to protect and manage for public use and enjoyment, special recreation areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values." (FSM 2372).

The primary distinction between these designations, based on the above descriptions from the Forest Service Manual, is that Special Areas have recreation as an underlying value while Special Interest Areas protect and “where appropriate” foster use.

36 CFR 294.1 - states that a Regional Forester (if under 100,000 acres) may designate certain suitable areas other than wilderness or wild areas which should be managed principally for recreation use.

Forest Service Manual, Title 2372 - provides specific direction concerning establishment and management of SA's, and indicates that forest planning may be one means for establishment.

Forest Service Manual, Title 2360 - provides specific direction concerning establishment and management of SIA's. Forest planning may be one means for establishment.

Wild and Scenic Rivers

Wild and Scenic Rivers Act of 1968 - establishes the Wild and Scenic Rivers System, defines Wild and Scenic Rivers, and provides policy for preservation, management, and a process for further designations.

Interagency National Wild and Scenic Rivers System; Final revised Guidelines for Eligibility (1982) - USDA and USDI - provides additional guidance to agencies on how to consider Wild and Scenic Rivers eligibility, suggesting that Wild and Scenic rivers be considered during forest planning.

Affected Environment

Research Natural Areas (RNA’s)

The research natural areas (RNA's) on National Forests are protected for the purposes of maintaining biological diversity, conducting non-manipulative research and monitoring, and fostering education. RNA's help preserve the Nation's natural heritage for future generations. The protection afforded RNA's is a critical step in maintaining a range of biological diversity of native ecosystems and species. Because they are protected in a natural state, RNA's also provide valuable opportunities for monitoring of long-term ecological change, and comparison of the effects of resource management activities against unmanaged controls. Research Natural Areas (RNA's) are areas within National Forests that the Forest Service has designated to be permanently protected and maintained in natural condition. These protected natural areas include:

- Unique ecosystems or ecological features
- Rare or sensitive species of plants and animals and their habitat
- High-quality examples of widespread ecosystems

The regional RNA program works within the framework of the National Research Natural Areas Strategy, circulated by the Chief of the Forest Service in July 1993. An effort is being made to

integrate the RNA program fully with other National Forest and Research programs and planning.

Under the current Wasatch-Cache National Forest Land and Resource Management Plan three areas are managed as RNA's. The first two, Red Butte and Morris Creek, were established by the time the forest plan was signed in 1985; Mollens Hollow was established in 1988.

- Red Butte Canyon near Salt Lake City 5140 acres
- Morris Creek adjacent to Farmington Canyon 154 acres
- Mollens Hollow within Blacksmith Fork watershed 1100 acres

These three areas are managed to protect their research values as pristine examples of certain types of ecosystems. No uses are allowed that diminish the natural values of these lands. Potential uses, which are possible but limited on a permit basis, are research, baseline monitoring, or other similar non-destructive or non-manipulative activities.

In 1998 an analysis of Research Natural Area needs was completed for National Forest lands in Utah (Tuhy 1998). These needs were defined for vegetation types that on National Forest lands that are currently lacking for existing RNAs in Utah. The objectives of establishing RNAs are to preserve a wide spectrum of pristine representative areas typifying important forest, shrubland, grassland, alpine, aquatic, geological, and similar natural situations that have special or unique characteristics of scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity; preserve and maintain genetic diversity; protect against serious environmental disruptions; serve as reference areas for the study of succession; provide on-site and extension educational activities, serve as baseline areas for measuring long-term ecological changes, serve as control areas for comparing results from manipulative research; and monitor effects of resource management techniques and practices” (FSM 4063).

Potential addition

Additional acreage contiguous to the existing Morris Creek RNA is proposed for designation in plan revision. With this 850 added acres, additional elevation range, slopes, aspects, soils and plant communities and dependent species would be represented in the RNA providing a larger and more diverse ecosystem to the RNA.

Special Interest Areas and Special Areas

Currently there are no Special Interest Areas or Special Areas established on the Wasatch-Cache National Forest. During recent forest planning and leadership discussions, the possible appropriateness of applying these categories to certain key areas has been recognized. Areas identified in this draft EIS are noted in Table SD-1 below.

Table SD-1. Potential Special Interest Areas

Area Identified	Value
Lower Logan Canyon (2 areas separated by a road)	Large number of unique and sensitive or endangered plant species. In addition, this area includes the Douglas-fir/Ninebark habitat type identified by Tuhy (1998) as a need for protection within the RNA system.
Lower Red Butte (within existing RNA)	This area has many invasive species, including cheatgrass and several noxious weeds, and provides many opportunities for restoration ecology research as well as environmental education.
Willard Basin	Relic tall forb community as well as Burke's draba populations potentially threatened by recreation use (trespass OHV use).
W.C. Daniels School Forest	Utah State University's education and research forest under special use permit

Potential Research Natural Areas and Special Interest Areas

Some additional areas have recognized values for potential RNA or SIA designation. These areas were not analyzed under any alternative, but could be evaluated through later analyses. Some of these areas are identified below, but others are likely to occur on the Forest.

Ben Lomond Peak, Ogden Ranger District – This area is identified as a potential RNA because it has relic tall forb communities that may be more representative of typical conditions within this vegetation group than other areas on the Forest. Tall forb communities in this area, while likely to have been historically grazed, show little current effects from these uses. Species composition and associated ground cover appear to be relatively undisturbed. Because it is estimated that nearly 50 percent of the tall forb communities on the forest have been significantly altered or lost, it is important to identify areas to protect these ecologically sensitive types.

Western portion of the Deseret Peak Wilderness, Salt Lake Ranger District – This area, which runs from the western Forest boundary in Skull Valley to Deseret Peak, has representative Basin and Range plant communities in relatively undisturbed conditions. This potential Research Natural Area has not been grazed in recent history and communities from low elevation Wyoming big sagebrush to bristlecone and limber pine are present. In addition, there is a potential to research possible cryptogamic soil crusts as well. Access is limited, but these communities provide invaluable reference conditions from which management activities could be compared.

Portions of Tri-Canyon Area, Salt Lake Ranger District – This area could be recognized as a special area with a number of values identified, including relic tall forb communities that have recovered from historical mining, logging and development; value as critical watershed and opportunities to educate about the importance of watersheds for communities; and value as a broad scenic backdrop for communities, as well as outstanding scenery within the area. Because it is so close to the large urban Salt Lake Valley communities, its values are easily accessed and

could be defined in an open public process, highlighted, appreciated and protected for current and future communities.

In addition to those specific areas mentioned above, there is the need and potential for an aspen-dominated research natural area in the Bear River Range, or the Wasatch Range. Because of the history of livestock grazing in the Bear River Range especially, there is a need for an area that would provide a comparison with potential species composition and structure in these aspen communities. Possible areas outside existing allotments are in the Bear River Range near Franklin Basin or in the Wasatch Range in Big Cottonwood Canyon.

Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 was enacted to protect and preserve in their free-flowing condition, certain selected rivers of the nation and their immediate environments. In 1998, the Wasatch-Cache National Forest in consultation with other federal agencies undertook an inventory of the rivers on the Forest to determine whether any might be eligible as wild and scenic rivers (USDA Forest Service 1999c). The inventory made no decision regarding designation, nor does the Forest Service have this authority, one that is usually exercised by the U.S. Congress.

The inventory included 82 rivers that were segmented into 96 river sections (or segments) for analysis. All segments were subjected to a preliminary screening of values, and 54 segments were found that might potentially have at least one outstandingly remarkable value. The identified values of these 54 were then further scrutinized, as was their free-flowing status. Of the 54 segments in the detailed study, 50 were found to be free flowing. Of these 50, 33 were found to possess at least one outstandingly remarkable value and were considered eligible for the National Wild and Scenic Rivers System. These river segments are classified as wild, scenic or recreational based on the amount of development present on each segment.

Since the publication of the DEIS in May 2001, new information regarding Little Bear Creek has changed the eligible segment length from 4.5 miles to 1 mile. The classification of this segment and for White Pine Creek, Spawn Creek, and Bunchgrass Creek were reported erroneously in the DEIS as Wild; these river segments are correctly classified in this FEIS as Scenic.

Since the completion of the inventory, the values identified during that process have been protected, as is required by law and policy. Following the inventory phase of the Wild and Scenic Rivers study process; another study to assess suitability and make recommendations is to be conducted. The suitability study can be completed after revision of this forest plan. The Forest Service is required to protect identified values until a suitability study determines whether a river is suitable or not. Suitable rivers are protected until designated by Congress, or otherwise directed by other legal means.

Table SD-2. Names and Classification of 33 Eligible River Segments

Wasatch-Cache National Forest Eligible Wild & Scenic Rivers		
	River Name and Eligible Segment	Classification
1	Henry's Fork: Henry's Fork Lake to Trailhead	Wild
2	West Fork Beaver Creek: Source to Forest Boundary	Wild within Wilderness Scenic below Wilderness
3	Middle Fork Beaver Creek: Beaver Lake to Confluence with East Fork Beaver Creek	Wild within Wilderness Scenic below Wilderness
4	Thompson Creek: Source to Hoop Lake Diversion	Wild
5	West Fork Blacks Fork: Source to trailhead	Wild within Wilderness Scenic below Wilderness
6	East Fork Blacks Fork: Headwaters to confluence with Little East Fork	Wild
7	Little East Fork: Source to Mouth	Wild
8	Blacksfork: Confluence of West Fork and East Fork to Meeks Cabin Reservoir	Recreational
9	West Fork Smiths Fork: Source to Forest boundary	Scenic
10	East Fork Smiths Fork: Red Castle Lake to trailhead	Wild
11	Hayden Fork: Source to Mouth	Recreational
12	Stillwater Fork: Source to Mouth	Wild within Wilderness Scenic below Wilderness
13	Ostler Fork: Source to Mouth	Wild
14	Left, Right, and East Forks Bear River: Alsop Lake and Norice Lake to near Tralihead	Wild
15	Boundary Creek: Source to confluence with East Fork Bear	Wild
16	High Creek: High Creek Lake to Forest Boundary	Wild
17	Lefthand Fork Blacksmiths Fork: Source to Mouth	Recreational
18	Logan River: Idaho state line to confluence with Beaver Creek	Scenic
19	Logan River: Confluence with Beaver Creek to Bridge at Guinavah-Malibu Campground	Recreational
20	Beaver Creek: South Boundary of State Land to Mouth	Recreational
21	White Pine Creek: Source to Mouth	Scenic
22	Temple Fork: Source to Mouth	Scenic
23	Spawn Creek: Source to Mouth	Scenic
24	Bunchgrass Creek: Source to Mouth	Scenic
25	Little Bear Creek: Little Bear Spring to Mouth	Scenic
26	Main Fork Weber River: Source to Forest Boundary	Scenic
27	Middle Fork Weber River: Source to Forest boundary	Wild
28	Beaver Creek: Source to Forest boundary	Recreational
29	Provo River: Trial Lake to U35 Bridge	Recreational
30	Left Fork South Fork Ogden River: Frost Canyon/Bear Canyon Confluence to Causey	Wild
31	Willard Creek: Source to Forest boundary	Scenic
32	Red Butte Creek: Source to Red Butte Reservoir	Scenic
33	Little Cottonwood Creek: Source to Murray City Diversion	Recreational

Environmental Consequences

Potential RNA additions and SIA establishment

Table SD-3 notes the acres, by alternative, included in each RNA and SIA. Alternatives 1, 2, 6, and 7 provide the most protection to a variety of ecosystems. Alternatives 3, 4, and 5 maintain the existing acres of RNAs and propose no acres of SIAs.

Table SD-3. Acres of Research Natural Areas and Special Interest Areas (rounded to the nearest 100 acres) by alternative.

Designation	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Red Butte RNA	4,650	4,650	4,650	5,500	4,650	4,650	4,650
Morris Creek RNA	1,050	1,050		200	200	1,050	1,050
Mollens Hollow RNA	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Total RNA Acres (MPC 2.4)[1]	6,900	6,900	5850	6,900	6,050	6,900	6,900
Red Butte SIA	850	850	850	0	850	850	850
Logan Canyon SIA	13800	13800	0	0	0	13800	22550
Willard Basin SIA	200	200	0	0	0	200	2200
Daniels Experimental Forest SIA	1700	0	0	0	0	1700	1700
Tri Canyons Special Area	0	17,600	0	0	0	0	0
Total SIA Acres (MPC 2.7)	16,550	32,450	850	0	850	16,550	27,300

[1] These acres include acres mapped as MPC 3.1 or MPC 3.1a within the boundary of the Research Natural Area.

RNA Changes

In Alternatives 1, 2, 6 and 7 additional acreage (an estimated 850 acres) contiguous to the existing Morris Creek RNA is added. With this addition, greater elevational gradient and associated climatic conditions, aspects, soils, plant communities, and dependent species would be represented in the RNA providing a larger and more diverse ecosystem to the RNA. Currently, most of these north-facing slopes are only lightly used, if at all, by recreationists (occasional hikers/climbers). The area has no system roads or trails within it
While the area would be posted as off limits to recreation, this is probably would have little effect on existing use patterns. There is no known research currently being conducted in the area. Prescribed fire as well as wildland fire use would be encouraged as a component of research in order to study the effects of fire on the fire-dependent plant or fire-tolerant plant communities that occur in the area (Gambel oak, quaking aspen, and mountain mahogany).

Alternative 1, 2, 3, 5, 6, and 7 would remove approximately 850 acres from the **Red Butte Canyon RNA** and place those acres in Special Interest Area status because of the high amount of introduced and weedy species that occur. This provides a potential for manipulative restoration ecology research, which is incompatible with RNA direction. Alternative 4 keeps these acres in RNA status.

Alternatives 3, 4, and 5 would not add this acreage as part of the RNA system. Currently, examples of environments within the Wasatch Mountain Range are considered under-represented by Forest Service and Heritage ecologists. In these alternatives, no protected status would exist for monitoring and potential research associated with these environments.

SIA additions
Alternatives 1, 2, 3, 6 and 7 provide SIA management prescriptions for the four areas listed above in different combinations.

The **Lower Logan Canyon SIA** would be added in Alternatives 1, 2, 6, and 7. In addition, Alternative 7 would manage the roadless (MPC 2.6) south-facing slopes in the lower portion of the canyon as an SIA (botanical area), which would add approximately 8,750 acres. For this area rock climbing activities or other undeveloped recreation might be limited or redirected, if it was determined that use patterns could affect specific plant species at sites where these species exist.

In **potential Lower Red Butte**, a portion of the existing RNA (about 850 of the total 5140 acres) would be reclassified as an SIA in Alternative 1, 2, 3, 6 and 7. In these alternatives more flexibility for restoration ecology research would be provided (than if the area remained part of the RNA). Current uses in this prescription area would be modified so that the research could be conducted in a controlled manner.

The **potential Willard Basin SIA** would be added in Alternatives 1, 2, 6, and 7. In this small tall forb area, recreation use patterns, mostly motorized uses, but also other non-motorized recreation that might affect the tall forb setting would be controlled to the extent that the relic tall forb community was protected.

Intermittent on and off-site interpretive programs could be provided for each of these new SIA's to enhance public knowledge and appreciation for their associated values.

In Alternatives 4 and 5, the areas identified above would not be protected or recognized by SIA prescription, with potential loss or modification of the identified values over time.

W.C. Daniels School Forest – This area has operated under an agreement between the Forest Service and Utah State University for many years. The State of Utah owns one of the four sections that make up the W.C. Daniels School Forest, while the other three are National Forest lands. It is unlike the previous three SIA's in that reclassification of it as an SIA (under Alternatives 1, 2, 6, and 7) is largely recognition of the existing situation, but places the area within the Forest Service Manual's direction for SIA's. Under Alternatives 1 and 2 the road corridor that runs through this SIA would be managed within the SIA, while under Alternatives 6 and 7 the road corridor has a separate management prescription category (MPC) for motorized recreation (MPC 4.4). This road corridor has been used by recreationists for many years, and is a major seasonal route on the eastern part of the Logan Ranger District. The key difference between the prescription scenarios presented for the road corridor within the school forest is that the 4.4 MPC highlights the recreation values while the 2.7 prescription places emphasis on the special interest values of the area. Management of the area under Alternatives 2, 4, or 5 would still be as the W.C. Daniels School Forest but under other MPCs without SIA designation.

Potential Special Area Designation

Alternative 2 includes a **potential Tri-Canyon Special Area**. Under this alternative a process would be initiated among the Forest Service, other interested governments and agencies, business groups, and citizenry to identify values, refine management direction and add additional detail to the desired future condition for this area based on this process.

Under Alternative 1, large parts of this area are recommended for Wilderness. For Alternatives 3, 4, and 5 management would be as depicted by prescription. There would be no special recognition of the area other than values embodied in the mapped prescriptions.

Wild and Scenic Rivers

Under all alternatives, the values identified by the Wild and Scenic River inventory would have interim protection until a suitability study is completed. Standards for the protection of these values (which vary depending on classification as wild, scenic, or recreational) are provided as an appendix to the proposed Forest Plan. In general, those rivers preliminarily classified as wild can have the least modification of their natural setting; scenic rivers allow somewhat more modification; and recreational rivers allow the most. Ongoing activities at the time of eligibility inventory generally will not be in conflict with protection of values. New projects and proposals that could affect the identified outstandingly remarkable values and free flow must be considered in light of interim protection guidance, and potential effects disclosed through standard environmental analysis processes. The protection standards apply under all alternatives.

Topic 9 – Oil and Gas Leasing

Introduction

Oil and natural gas are important resources for the people of the United States. They are the primary sources of energy for mechanical equipment, lighting, heat, transportation communications and production of food. Petroleum products are important components in agriculture, medicine, and manufacturing of fibers and plastics. The federal government seeks to reduce the dependency on oil and gas from other nations by continuing to locate and develop its own reserves. Domestic oil and gas reserves, including those beneath National Forest System lands, are important nationally because they represent a more reliable reserve of energy. Also, the refineries located along the Wasatch Front and their economic value to Utah, are dependent upon relatively local domestic sources for crude oil.

This section will address the scope of the leasing analysis for the forest plan revision. Within the affected environment subsection, information is presented on the area's current production, oil and gas potential, existing leases, mineral ownership, and industry interest in the area. Within the environmental consequences subsection, the effects of oil and gas activities as proposed in the alternatives are shown.

Leasing Analysis in the Forest Plan Revision

Part of the Wasatch-Cache National Forest is covered by a leasing EIS. The 1994 North Slope Oil and Gas Leasing Final Environmental Impact Statement and Record of Decision covered lands along the North Slope of the Uinta Mountains (USFS Forest Service 1994). The Record of Decision initially made available about 219,000 acres of federal minerals for leasing but removed leasing consideration on 23,000 other acres. (A portion of the area, about 32,000 acres, included in the Record of Decision is on the Ashley National Forest). The Record of Decision was appealed. The appeal resulted in a settlement whereby the Wastach-Cache and Ashley National Forest Supervisors withdrew a portion of their decision for specifically identified roadless lands pending further analysis (Levere and Heaton, 1994). The remainder of the decision remained intact and has been implemented. It will hereafter be referred to as the 1994 Leasing Decision.

The oil and gas analysis included in the forest plan revision is limited to the area removed from implementation as a result of the appeal settlement. The area being analyzed is within the Western and Eastern Uinta Mountains Management Areas and will be referred to as the Appeal Settlement Zone. On the Wasatch-Cache National Forest this area totals about 68,300 acres of federal minerals (This number is greater than acres shown in the DEIS because of mapping corrections). The acreages shown in all the tables to follow include all federal minerals within the proclaimed boundary of the forest, not just the federal minerals under Forest Service administered surface. It is also important to note that the actual surface acres within this area is 70,000, however; there are 1,700 acres of private minerals for which we have no decision authority. To provide important context for the analysis within the Appeal Settlement Zone, additional information on leasing of adjacent national forest has been included.

The 1994 Leasing Decision is considered still in effect. It will not be reconsidered in this forest plan revision. The 1994 Leasing Decision will be brought into compliance with the updated terminology and direction of the Revised Forest Plan. There are roadless acres within the area covered by the 1994 Leasing Decision. Road construction and reconstruction associated with leasing will be consistent with the final outcome of the RACR.

Laws, Policy and Direction

- **Mineral Leasing Act of 1920 –** Deposits of coal, phosphates, sodium, oil, shale, or gas owned by the United States, including those in National Forests, were made subject to disposition by leasing. The Bureau of Land Management (BLM), Department of the Interior, was made responsible for leasing under this Act. This Act has been amended to include more minerals.

- **Mineral Leasing Act for Acquired Lands of 1947** – All deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur that are within lands acquired by the United States may be leased by the Secretary of Interior under the same terms and conditions as contained in leases issued under the 1920 Act. No mineral deposits shall be leased without the consent of the head of the executive department having jurisdiction over the lands containing the deposit and subject to such conditions as that official may prescribe.

- **Mining and Minerals Policy Act of 1970** – The continuing policy of the federal government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly and economic development of domestic mineral resources.

- **Energy Security Act of 1980** – Directs the Secretary of Agriculture to process applications for leases and permits to explore, drill, and develop resources on National Forest System (NFS) lands, notwithstanding the current status of any management plan being prepared.

- **The Federal Onshore Oil and Gas Leasing Reform Act of 1987** – Expands the authority of the Secretary of Agriculture in the management of oil and gas resources on NFS lands. Without the Forest Service's approval, the BLM cannot issue leases for oil and gas on NFS lands and the Forest Service must approve all surface-disturbing activities on NFS lands before operations commence.

- **36 CFR Parts 228 and 261 -** On April 20, 1990, the Forest Service completed the final regulations and procedures to implement the 1987 Reform Act. The regulations establish a staged decision process designed to accommodate the nature of oil and gas exploration and development. This staged decision process is explained in Appendix I.

- **Executive Order 13212** – On May 18, 2001, President George W. Bush directed agencies to take appropriate actions to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.

Concepts Related to Oil and Gas Leasing and Development Analysis and Decisions

The following stages of oil and gas decisions could occur. In the initial stage an environmental analysis is conducted to determine the environmental consequences of lease options. The Deciding Officer selects an option. The decision states which lands are administratively available and which specific lands are authorized for leasing.

The next stage of analysis and decision occurs when an operator submits a surface use plan of operations (SUPO) with an Application for Permit to Drill (APD). The Forest Service conducts a site-specific analysis of the proposed well location and the potential effects. A decision document is then issued based on the analysis. Specific resource protection mitigation measures and monitoring requirements are part of the decision. Compliance to forest standards and guidelines would also be necessary.

If the exploratory well makes a discovery and additional wells are needed to confirm the field, then another level of environmental analysis and decision are necessary, to disclose the effects of a field development.

Affected Environment

Current Oil and Gas Production

Since the discovery of oil and gas in the 1960s southwestern Wyoming and north central Utah has been an area of petroleum exploration and development. The two counties within this area that include Wasatch-Cache lands are Summit County, Utah and Uinta County, Wyoming. There are 19 active wells on the Wasatch-Cache National Forest.

A total of 11 fields in Summit County, Utah make it the fourth largest producer of oil and the third largest producer of gas in the State (State of Utah, Division of Oil and Gas and Mining, 2001). The one field on national forest system lands in Summit County, the Bridger Lake Unit on the Mountain View Ranger District, contributes to these production levels with 6 active wells, Most production in the County is outside the forest from privately owned minerals. The Bridger Lake field was the first oil and gas showcase in the nation. First established in 1990, it represents a cooperative venture between the Forest Service and petroleum industry to develop the nation’s energy while maintaining its environmental integrity (USDA Forest Service, 1990c).

Fields in Uinta County, Wyoming produce the fourth largest amount of natural gas and fifth largest amount of oil in Wyoming (Wyoming Oil and Gas Conservation Commission, 2001). Of the 28 fields in the county, portions of the Luckey Ditch Unit and Whiskey Springs Unit, and several scattered wells outside of units are located on national forest system lands within the Wyoming portion of the Mountain View Ranger District. The majority of development in Uinta County, Wyoming is on adjacent BLM or private lands.

All current production is outside the Appeal Settlement Zone.

Oil and Gas Potential

Several sources have identified petroleum plays for southwestern Wyoming and north central Utah. A petroleum play is a geologic unit of known or postulated oil and gas accumulations sharing similar geologic properties.

In 1995 the United States Geological Survey conducted a national assessment of the oil and gas resources of onshore areas and state waters of the United States. The purpose of the National Assessment of United States Oil and Gas Resources (USGS, 1995) was to assess potential additions to proven oil and gas reserves based on the best information and theory available. The Assessment identified 4 plays associated with the northern part of the Uinta Mountains: 1) Moxa Arch, 2) basin margin anticline, 3) subthrust, and 4) Hogsback. One of the plays, termed the Basin Margin Anticline Play, scientists found a discovery in excess of 1 MMBOE to be not unlikely. The complete assessment with maps is available online at http://energy.cr.usgs.gov/oilgas/noga.

These plays closely correspond with more recent work completed by Chidsey. Chidsey in his 1999 report (Chidsey, Utah Geological Survey in Utah Geological Association, 1999) identified 10 plays in Summit County, four of which include areas of national forest. He concludes that despite current producing fields in Summit County, the county still contains large, promising areas that are virtually unexplored. He found the potential prospects are structurally and stratigraphically analogous to many producing fields in the thrust belt and other areas of the Rocky Mountain region. He identified the overlap of the North Flank subthrust-Green River basin and Hogsback Thrust as being the area with the highest exploration risk, but the largest reserve potential. A portion of these plays is within the Hayden Fork-Stillwater Fork and East Fork Bear area of the Appeal Settlement Zone.

In the 1990 Oil and Gas Potential Report prepared for the Forest by Kaldenback, he identified three north slope plays are targeted for exploration: the Moxa Arch, North Flank Fault subthrust, and Hogsback Thrust areas. Most activity is associated with the Moxa Arch where development began in the 1960s and continues. To date, areas associated with the North Flank Fault have not produced oil and gas. The majority of roadless lands are associated with this area. The complex subsurface geology, substantial drilling depths, the rugged terrain, and a short operating season due to high elevations complicate exploration. Eight exploratory wells have been drilled in areas associated with the Hogsback Thrust though none have resulted in oil and gas production on a continuing basis (USDA Forest Service 1994).

The three reports on potential in the Appeal Settlement Zone conclude the area has a high potential for oil and gas occurrence.

Existing Leases

A large portion of the north slope of the Uinta Mountains is currently under lease. Within the proclaimed boundary about 43,900 acres of federal minerals in Utah and 19,800 acres of federal minerals in Wyoming (see figure OG-1) are currently leased. A large portion of the Appeal

Settlement Zone, about 19,000 acres, is currently leased and within an established unit called the Table Top Unit. A unit is a block of leases which are consolidated to gain maximum development potential and minimize the need for surface facilities. Many of these leases were issued in the 1970s. Leases are issued for a period of 10 years; however, all leases within the Table Top unit are currently suspended so the time period does not apply (U.S. v Amerac Energy Corp., 1999). The Table Top Unit is shown on the oil and gas leasing maps.

A decision from the oil and gas analysis included in the forest plan revision applies only to future Federal leases. New requirements cannot be imposed on the contractual terms of existing leases nor can existing leases be revoked if a decision not to lease is made. Existing leases will be honored.

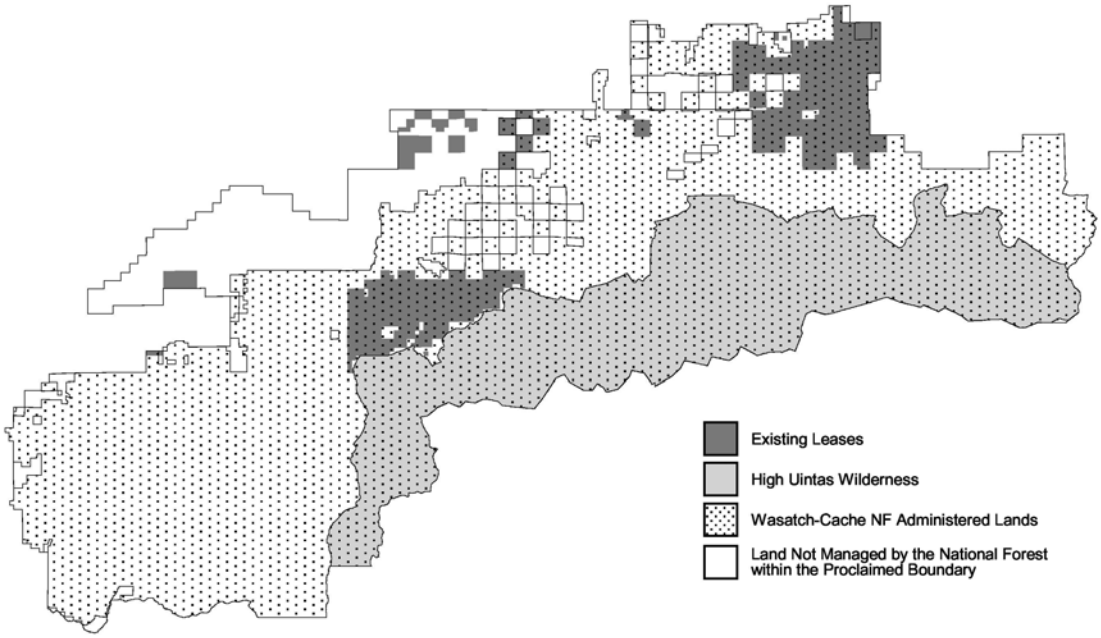


Figure OG-1 Existing Leases in the Uinta Mountains portion of the Wasatch-Cache National Forest

Industry Interest

Leasing interest in the North Slope of the Uinta Mountains area is still fairly high and is expressed primarily by smaller independent companies. New drilling activity on the Forest in the past several years has been limited due to the depressed oil market and the unavailability of adjacent lands (unleased lands) that create financial risk to adjacent lessees (Burkhardt, 2000). The surge in oil and gas prices since 1999 and the spectre of potential world hydrocarbon shortages may renew interest for exploration and development in the area.

Land and Mineral Ownership

On the Wasatch-Cache National Forest the federal government usually owns both the surface and mineral estate. Lands such as these that have never left federal ownership are considered public domain lands. Some lands, however have federal surface ownership with the minerals owned by private individuals The Forest Service does not have authority to issue leases on these lands because the federal government does not own the mineral rights. As such there is no leasing decision to be made by the Forest Service for the Federal surface/private minerals. An estimated 1,700 acres of private minerals are within the area being analyzed.

Environmental Consequences

The environmental consequences of implementing various leasing alternatives are discussed in this section, but also in other resource sections. For example, the effects of the leasing program on water and soils can be found in the watershed resources section.

Terms Used in This Section

- Not Administratively Available (NAA): A decision that lands are not available for leasing.
- No Lease (NL): A decision not to lease until, at some future time, lands are determined to be available for leasing.
- No Surface Occupancy (NSO): A lease stipulation prohibiting occupancy on or disturbance of the land surface to protect special values or uses. The stipulation would apply to well sites and production facilities such as tank batteries and compressor stations. Forest Plan standards and guidelines would govern the design, placement, and decisions related to any roads or other linear facilities (pipelines) that typically extend beyond the lease boundary.
- Controlled Surface Use (CSU): A lease stipulation allowing use and occupancy with special operational constraints for identified resource values.
- Timing Limitation (TL): A lease stipulation prohibiting drilling during specified time periods to protect identified resource values.
- Standard Lease Terms (SLT):

Oil and gas lessees incur numerous environmental obligations in order to comply with applicable laws and regulations. Standard lease terms require compliance with laws and regulations and are incorporated by reference into the lease to ensure that other energy and mineral resources and surface resources such as soil, water, and vegetation are protected (36 CFR 228). In addition to standard lease terms, federal managers can require stipulations to be part of the lease. Stipulations can be thought of as mitigation to protect other resources and place even more restrictions on oil and gas development by requiring certain condition be met. They include seasonal restrictions (Timing Limitation), operational restrictions (Controlled Surface Use) or avoidance (No Surface Occupancy). Resource stipulations for the forest have been developed so

the resources are sufficiently protected or that sufficient authority has been retained to apply needed mitigation if and when a drilling proposal is submitted. In cases where stipulations overlap, the more restrictive one applies.

1994 Leasing Decision for Adjacent Lands

The 1994 Leasing Decision that was implemented remains in effect. Under that decision, about 140,400 acres are administratively available and have been offered for bid both competitively and non-competitively. The analysis that was the foundation of the 1994 leasing decision is incorporated by reference.

Table OG-1. Acres available for lease under the 1994 Leasing Decision (listed by stipulation category)

Stipulation	Acres
Controlled Surface Use/ Timing Limitation	8,800
Controlled Surface Use	28,400
Timing Limitation	27,600
No Surface Occupancy	30,800
Standard Lease Terms	44,800

This area is further considered in context with the range of alternatives addressed in the forest plan revision in a later section under this Topic.

Difference in Stipulations from 1994 Leasing Decision to Revised Forest Plan

The 1994 Leasing Decision developed lease stipulations for site-specific resource areas. They are contained within the broader stipulation categories listed in the “Terms” section. For example, within the Timing Limitation stipulation, more specific stipulations were developed to protect elk calving areas, elk winter range and bighorn lambing areas since these are important resources on the Wasatch-Cache. Applicable stipulations are shown in Appendix G.

Most of the stipulations developed in 1994 are also considered for lands addressed under this forest plan revision. In several instances, however, new stipulations have been developed because of the use of management prescriptions that are applied only to the lands in this revision. For example, stipulations developed for management prescription categories 2.6, 4.1, and 4.2 will apply to appropriate areas within the Appeal Settlement Zone as mapped by alternative. Some stipulations developed in 1994 do not apply to the Appeal Settlement Zone because the resources they are protecting are not present within the ASZ. An example of this would be the No Surface Occupancy applied to developed campgrounds.

The revised forest plan will not change existing leases.

Determination of Effects

This section outlines the methods used to determine the magnitude of the effects.

Some Standards and Guidelines and four management prescriptions in the proposed Forest Plan were converted into stipulations that would be applied to new leases. Locations of the various resources and prescriptions were mapped where appropriate.

In order to analyze the environmental effects that could occur as a result of the leasing decision, a 'reasonably forseeable development' scenario (RFD) was developed by alternative to depict the type and scale of activity that could be reasonably anticipated. The RFD scenarios were developed using historical oil and gas information, geologic information and interpretation, and projected market trends. It must be recognized that future development and exploration may not occur as presented in the RFD scenarios but the scenarios provides a reasonable basis for analyzing potential subsequent activities and effects.

The RFD scenarios are defined for the portion of the North Slope that lies outside the 1994 Leasing Decision area. The base scenario assumes a maximum of 7 exploration wells. Applying the unit's historical discovery ratio of one field discovery per 5.6 drilled exploration wells indicates that the 7 projected exploration wells might discover one new producing field.

Important: The base scenario changes for each alternative depending on the lease stipulations or restrictions that would be applied to oil and gas activities. Also, the scenarios take into account a number of factors uniquely related to the suspended leases in the Table Top Unit (about 22,000 acres, including a portion outside the analysis lands). Once suspended leases in the Unit are activated, the time remaining before some leases reach expiration would be fairly short. This would preclude the amount of exploration that would otherwise be possible and affect the number of possible wells that might be drilled. Once the leases terminated, the degree to which the lands could be leased again and/or occupied would be subject to new stipulations identified under each of the alternatives. Further, it is unlikely that exploratory wells would be directionally drilled from outside the area due to the risk and high cost stemming from the complex geology, difficult terrain and short seasons due to elevation, and the uncertainty of being able to develop a field due to surface constraints, should one be discovered. (Burkhardt, 2001).

Due to the existing leases and Unit, field development could occur under any alternative, the effects of which would be within the range disclosed under Alternatives 3, 5, 6 and 7. This possibility is recognized but the scenarios for each alternative are designed to respond to the alternative for analysis purposes.

RFD BY ALTERNATIVE (see Table OG-2 for a summary of the activities related to each Alternative):

Alternative 1: This alternative would designate most of the 68,300 acres eliminated from the 1994 Leasing Decision as wilderness. No new leasing would be allowed. No activity would occur, with the possible exception of development on a block of existing leases within the Table

Top Exploratory Unit. This Unit will likely be explored. The RFD scenario shows that two exploratory wells would be drilled under this alternative before the leases expire once the lease suspension is lifted. One of those two wells would likely be the Table Top well which has already been authorized, but currently suspended pending this leasing decision.

Full field development is not predicted under this alternative because once current leases are explored, and should discovery not occur, then leases would expire, the leasehold would erode, and new leases would not be issued. Within the assumption that a discovery would be possible for every 5.6 wells drilled, the 2 wells possible on the units are unlikely to make a discovery.

Alternative 2: This alternative would be similar to Alternative 1 except it would not preclude leasing with No Surface Occupancy and therefore, directional drilling directed under fringe acreage could occur with the goal of either discovering or developing oil and gas under the NSO lands.

It is reasonably foreseeable that two exploratory wells would be drilled under this alternative, both on the Table Top Unit. One of those two wells would likely be the Table Top well which has already been authorized, but currently suspended pending this leasing decision. Once current leases expire, expected soon after the leases are released from suspension, it is unlikely that exploratory wells based on the revision leasing decision would be directionally drilled from lands outside the analysis lands due to the complexity of the geology, associated cost, high risk, and very limited ability to develop a field along the margins of the NSO lands even should there be a discovery (Burkhardt, 2001). Therefore, full field development is not predicted by this alternative.

Alternative 3: Under this alternative, four exploratory wells would be drilled with the possible discovery of one field. Three of the exploratory wells would likely be in the Table Top area and the other being southwest of the existing fields in the Hickey Mt.- Table Mt. Area. The increased number of wells anticipated is due to fewer restrictive surface occupancy stipulations.

Should one of these exploratory wells encounter producible quantities of hydrocarbons, field development would occur and would be expected to include approximately five development wells in addition to the discovery well.

Alternative 4: This alternative is “continue management under the 1985 forest plan as amended” and since there currently is no leasing decision for the “appeal settlement zone”, that situation would continue. This alternative maintains the current lessees “in limbo” with respect to their leases in the Table Top Unit. All of the leases within the Unit would remain suspended and the development status would remain clouded by the lessee’s valid existing right on those lands.

Alternative 5: Under this alternative the full RFD scenario is envisioned which consists of 7 exploration wells and the discovery of one field (approximately 5 development wells in addition to the discovery well). One of the non-productive exploratory wells would possibly be converted into a water injection well to facilitate disposal of produced water (Burkhardt, 2001).

Alternative 6: This Alternative would be similar to Alternative 3. Since Alternative 6 extends the recommended wilderness area farther to the west than does Alternative 3, the potential for impacts to that area by development of existing leases in the Table Top Unit is greater than for Alternative 3.

Alternative 7: Under this alternative, five exploratory wells would be drilled with the possible discovery of one field. Three of the exploratory wells would likely be in the Table Top area and the other two being nearer to the current development on the Mountain View Ranger District. The increased number of wells anticipated is due to the amount of acres allowing surface occupancy.

Should one of these exploratory wells encounter producible quantities of hydrocarbons, field development would occur and would be expected to include approximately five development wells in addition to the discovery well.

Table OG-2. Summary of Activities Expected Under RFD Scenarios for Each Alternative

Activity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	*Alt 7*
EXPLORATION ACTIVITIES							
Exploratory well pads	2	2	4	Suspension continues	7	4	*5*
Miles of new road construction	3	3	6	0	10-11	6	*7.5*
Acres Disturbed by Exploratory Wells	20	20	40	0	70	40	*50*
DEVELOPMENT ACTIVITIES							
New fields Developed	0	0	1	Suspension continues	1	1	1
Acres Disturbed by New Field Development	0	0	35	0	35	35	35
Miles of road construction or reconstruction	0	0	4	0	4	4	4
TOTAL DISTURBED ACRES	20	20	75	0	105	75	85

Footnote: ***Exploration activities:*** *The total ground disturbance would average about 10 acres for each exploratory well (includes 1.5 miles of new road construction for each exploratory well—acreage disturbance from road is incorporated into 10 acres). See Appendix B for the explanation of how surface disturbance was calculated.*
Development Activities: *The total land area that could be disturbed by development for each field would be about 35 acres (includes .8 miles of new road construction or reconstruction for each development well—acreage disturbance from road is incorporated into 35 acres). See Appendix B for the explanation of how surface disturbance was calculated.*

Effects on Oil and Gas Resources from Availability Decisions

A decision regarding oil and gas leasing is actually two decisions: first, what lands should be made available for leasing and second, authorization of specific lands for leasing with appropriate stipulations applied.

Decisions to make lands not administratively available for leasing or not to authorize lands for leasing precludes the exploration and potential discovery of oil and gas resources and can make subsurface oil and gas resources unrecoverable. If drilling and production occurs on adjacent private lands drainage of federal reserves may occur and result in lost federal revenues and returns to the counties and states. Also, the opportunity to explore and produce on adjacent leased lands may be affected by precluding exploration and production from reservoirs under unavailable lands.

Alternatives 1, 2, 3, 6 and 7 would administratively eliminate various amounts of acreage from leasing consideration. Alternative 1 would remove the most acreage from leasing consideration followed by Alternatives 2, 7, 6 and 3. Alternative 5 allows all lands within the revision analysis area to be leased. Areas determined not administratively available are based on the lands recommended for wilderness.

Table OG-3. Available Acres and Not Available Acres by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	*Alt 7*
Acres available for leasing	0	40,100	50,100	N/A	68,300	48,300	*47,900*
Acres not available for leasing	68,300	28,200	18,200	N/A	0	20,000	*20,400*

Footnote: N/A = not applicable

Effects on Oil and Gas Activities by Type of Stipulation

Lease stipulations can restrict the placement, number and type of wells and facilities, reduce exploration and development opportunities, and increase drilling and operational costs. Lease stipulations were factored into the development of the RFDs. Types of stipulations are tabulated below, and discussed in the following narrative. The Oil and Gas Leasing maps prepared for each alternative show the application of these stipulations spatially within the ASZ.

Standard Lease Terms

All leases are subject to Standard Lease Terms (SLT). These are the least restrictive stipulations on lands potentially available for leasing. With the exceptions noted below, SLT permits year round occupancy of leased lands and therefore, without special stipulations (restrictions), provide full access and the maximum opportunity to explore for oil and gas resources.

SLT require an operator to minimize adverse impact to air, water, land, visual, and biological resources, and to other land uses or users. Standard Lease Terms require that the lessee comply with all applicable laws, regulations, and formal orders. If threatened and endangered plant and animal species or cultural resources are present, then development may not be possible for those portions of the lease. Known potential for these situations are noted in Lease Notices attached to leases in potentially affected areas. Previously unknown threatened or endangered species and/or cultural resources may be identified during preliminary on-site inspections. Effects to these resources can usually be mitigated but may substantially increase cost to the operator.

If potential negative effects to surface resources can be mitigated under Standard Lease Terms, which include the following provisions, in addition to surface use requirements listed in 36 CFR 228, then no additional stipulations are necessary:

- Drill site may be moved 200 meters
- Operations may be delayed up to 60 days

Leases issued with SLT only have the lowest level of restrictions and meet the Forest Service mineral policy direction to encourage development of mineral resources.

Table OG-4. Tabulation of Lease Stipulations Applied to Each Alternative

Resource Component	Alternatives						
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	***Alt 7***
Wildlife							
Elk Calving Area	NL	NSO	TL	N/A	SLT	NSO	*TL*
Elk Winter Range	NL	NSO	TL	N/A	SLT	NSO	*TL*
Moose Winter Range	NL	NSO	TL	N/A	SLT	NSO	*TL*
Bighorn Sheep Lambing area	NL	NSO	TL	N/A	SLT	NSO	*TL*
Threatened & Endangered	NL	NSO	LN	N/A	LN	NSO	*LN*
Sensitive	NL	NSO	CSU	N/A	SLT	NSO	*CSU*
Watershed							
Unstable Soils	NL	NSO	CSU	N/A	SLT	NSO	*CSU*
Geologic Hazards	NL	NSO	CSU	N/A	SLT	NSO	*CSU*
Slopes > 40%	NL	NSO	NSO	N/A	SLT	NSO	*NSO*
Wetlands > 40 acres	NL	NSO	NSO	N/A	SLT	NSO	*NSO*
Riparian Areas > 40 acres	NL	NSO	NSO	N/A	SLT	NSO	*NSO*
Recreation							
4.1 Backcountry nonmotorized	NL	NSO	NSO	N/A	SLT	NSO	*CSU/ NSO*
4.2 Recreation nonmotorized	NL	NSO	NSO	N/A	SLT	NSO	*CSU*
Roadless							
2.6 undeveloped	NL	NSO	NSO	N/A	SLT	NSO	*NSO*

NL=No Lease, NSO=No Surface Occupancy, CSU=Controlled Surface Use, TL=Timing Limitation, and LN=Lease Notice

Special Lease Stipulations

The following are special lease stipulations which are provisions that modify standard lease rights and are attached to and made a part of a lease. Special stipulations provide for greater protection of identified resources and mitigation of negative effects than Standard Lease Terms allow. The Rocky Mountain Regional Coordinating Committee, a joint Forest Service-BLM committee, developed guidelines for use of these stipulations in 1989. Refer to “Uniform Format for Oil and Gas Lease Stipulations”, Final Recommendations Prepared by Rocky Mountain Regional Coordinating Committee, March 1989, for additional information about the use of these stipulations.

Timing Limitation Stipulation (TL) (Seasonal Restriction): Prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

TL is used when necessary to restrict exploration activities on leased lands for a period of time greater than 60 days. TL provides accessibility for a portion of the year, and maintains the potential for discovery and utilization of potential oil and gas resources. TL could increase exploration costs if the window available for drilling is too narrow. Use of TL meets Forest Service national mineral policy.

TLs could increase exploration costs if a well is not completed within required time limits. Shutting a drilling operation down and leaving the equipment idle or moving the equipment to another site and moving it back increases costs. TL may push operations into the winter, where activities on frozen ground or in frigid weather can also increase operator costs.

When a drilling proposal is submitted, on the ground conditions may allow an exemption or require an extension of timing limitations based on seasonal conditions or habitat use.

Controlled Surface Use (CSU): Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights.

CSU stipulations are designed to identify standards that must be met by operators and to control drilling or production operating standards to mitigate potential adverse effects to surface resources. Such stipulations permit year-round occupancy and accessibility to leased lands. They maintain potential for discovery and utilization of oil and gas resources while providing for mitigation of effects on other resources. Compliance with CSU stipulations may require more decision-making responsibility at the time surface-disturbing activities are proposed. Compliance with a CSU stipulation could increase the cost of oil and gas activities by requiring use of expensive technology to meet mitigation requirements. Leasing with CSU stipulations meet Forest Service mineral policy direction.

No Surface Occupancy (NSO): Use of occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.

Even though NSO stipulation prohibits surface occupation for exploration or development of oil and gas resources, the subsurface resources are legally available if they can be accessed by means other than occupying the surface specified in the NSO stipulation. Leasing an area with NSO, rather than declaring it “not administratively available” for leasing, may allow development through directional drilling if lands adjacent are available for leasing with surface occupancy or are privately owned. Technology limits the distance a well’s surface location can be placed from the downhole location. Also, in some areas, it is technically impossible to directionally drill. Directionally drilled wells are more costly to drill and to maintain and as such

reach the end of their economic life sooner than straight-hole wells. While drilling and production may be more costly, leasing with NSO does offer opportunities for exploration and development of lands where surface occupancy is prohibited. Leasing with NSO meets Forest Service minerals policy direction.

Lease Notice (LN): Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee should consider when planning operations, but does not impose new or additional restrictions. Lease Notices attached to leases should not be confused with Notices to Lessees which serve as instructions on specific items of importance within a specified area.

Effects by Alternative

The table below displays the acres subject to oil and gas stipulations that would be applied by Alternative. See the oil and gas Alternative maps for the spatial application of the leasing stipulations.

Table OG-5. Acres with Stipulations Listed by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Available for Leasing	0	40,100	50,100	--	68,300	48,300	47,900
Available with Stipulations							
No Surface Occupancy	0	40,100	37,200	--		44,700	20,900
Controlled Surface Use	0	0	2,100	--		3,600	24,900
Timing Limitation	0	0	300	--		0	100
CSU/TL	0	0	100	--		0	1000
Standard Lease Terms	0	0	10,400	--	68,300	0	1000

The following discussion focuses on the differences between the Alternatives in the number of acres available for leasing and the number of acres where different stipulations would be applied. The size and shape of an area assigned an NSO stipulation affects a potential operator's ability to access the subsurface resource from adjacent lands. In Alternatives 2, 3, 6 and 7, areas assigned an NSO stipulation as a result of management prescription generally tend to be big blocks and would affect drilling access. However, some areas within alternatives 3 and 7 where NSO is assigned because of resource concern such as steep slopes, areas are not expansive and could be more easily accessed from adjacent lands. The shape of an area where CSU would be applied is less important because CSU permits year-round occupancy and maintains potential for discovery and development of oil and gas resources.

Alternative 5 would have no acres stipulated with NSO. Of the acres available Alternative 2 would have the greatest percentage of acres leased with NSO stipulation followed by Alternatives 6, 3 and 7.

Effects from Management Prescriptions

This discussion focuses on the four management prescriptions which by their own definition remove an area from leasing availability or place limits on oil and gas activities beyond those given in Standard Lease Terms. In some alternatives the amount of lands authorized for leasing and under what stipulations is determined by alternative descriptions not by individual management prescriptions. The applicability of management prescriptions to each alternative is described below.

Management prescription 1.5 removes lands from leasing availability and affects four of the seven alternatives. Effects directly as a result of the remaining three management prescriptions (2.6, 4.1, and 4.2) are only applicable in Alternatives 3 and 7. This is because in Alternatives 1, 2 and 6, alternative descriptions place broad restrictions on leasing for protection of roadless areas. Alternative 5 has been developed leases with standard lease terms.

Other management prescriptions may highlight important resources but are too broad to have associated stipulations.

Management Prescription 1.5 – Recommended Wilderness – No Lease

Areas mapped with this prescription are not available for leasing. No new leasing is allowed. Alternative 1 precludes leasing throughout the ASZ so the restriction from this prescription does not affect leasing availability. The restriction on leasing from recommended wilderness is the greatest in Alternative 2 followed by Alternatives 7, 6 and 3. Alternative 5 has no acres allocated to Management Prescription 1.5 and Alternative 4 makes no leasing decision.

Management Prescription 2.6 – Undeveloped Areas – NSO

Areas mapped with this prescription are leased with a NSO stipulation. This means the mineral estate may only be accessed from adjacent areas. Of the two alternatives affected by application of the 2.6 prescription, Alternative 3 has 9,600 acres allocated to the prescription, while Alternative 7 has 4,200 acres allocated.

Management Prescription 4.1 – Backcountry Nonmotorized – NSO/CSU

For those 4.1 areas leased with no surface occupancy, the mineral estate may only be accessed from adjacent areas. Of the two alternatives affected by application of the 4.1 prescription, Alternative 3 allows leasing in all of the 14,500 acres allocated to 4.1 with no surface occupancy while alternative 7 leases the portion of 4.1 acres with high quality back country recreation values, about 10,500 acres, under the same conditions.

The remaining portion of the acreage assigned a 4.1 prescription in Alternative 7 (1,300 acres) will be managed under a controlled use stipulation. Use and occupancy is allowed (unless restricted by another stipulation), but will be strictly applied. Activities must maintain primitive character and be screened from trails and other facilities. Roads accessing well pads will be

open for administrative use only. If the well is a dry hole, the road will be closed and decommissioned to public travel.

Management Prescription 4.2 – Recreation Nonmotorized – NSO/CSU

In Alternative 3 oil and gas leasing is allowed with NSO in areas allocated to 4.2. This means the mineral estate may only be accessed from adjacent areas that allow surface occupancy. In Alternative 7 the majority of lands allocated to 4.2, about 1,000 acres are managed for surface occupancy with a controlled use stipulation. Use and occupancy is allowed, but will be strictly applied. Roads accessing well pads will be open for administrative use only. If the well is a dry hole, the road will be closed and decommissioned to public travel.

Effects Oil and Gas Activities from Major Resource Programs

This section discusses how oil and gas activities are affected by proposed Standards and Guidelines and stipulations developed for other resources.

Effects on Oil and Gas Activities from Air

Mineral activities are regulated by the state and must meet established requirements.

Effects on Oil and Gas Activities from Fish and Wildlife Management

As a minimum all leases require a CSU stipulation to determine the presence of sensitive species. The CSU stipulation usually restricts drilling and other activities within a specified distance from the area requiring protection if activities would likely result in degradation of habitat, abandonment, disruption, or other failure.

Effects on Oil and Gas Activities from Livestock Grazing

Occupancy and use for oil and gas activities are not restricted by grazing activities.

Effects on Oil and Gas Activities from Recreation Management

In Alternatives 1, 2, 3 and 6 occupancy and use for oil and gas activities are restricted in those areas where backcountry recreation opportunities are being emphasized. In Alternative 7 oil and gas activities are similarly restricted with no surface occupancy however surface occupancy is allowed in one backcountry area but with restrictions to protect the primitive setting. Compliance with a CSU stipulation could increase the cost of oil and gas activities to meet mitigation requirements. In addition, seismic activities are restricted in certain times and in certain areas because of recreation use.

Effects on Oil and Gas Activities from Soil Management

An NSO stipulation requires wells to be located on slopes no greater than 40 percent. The acreage restricted by this stipulation varies little across the range of alternatives. They tend to be small areas of NSO that would allow well location near, but not on, the initial and preferred location.

Effects on Oil and Gas Activities from Special Area Designation

Special designations include Research Natural Areas, Special Interest Areas, Scenic Byways, and the three different classifications for designated wild and scenic river segments. Research Natural Areas and Special Interest Areas are not within the area being analyzed for oil and gas leasing, so there is no effect on oil and gas activities. A portion of the Mirror Lake Scenic Byway is within the ASZ and will be protected to maintain its high scenic integrity objective. A Controlled Surface Use stipulation is applied to eligible stream segments to protect the identified outstandingly remarkable value. Depending on what value is identified some restrictions may be placed on oil and gas activities.

Effects on Oil and Gas Activities from Inventoried Roadless Area Management

There is an area of existing leases, the Table Top Unit that could be explored regardless of roadless area management considered in the forest plan revision. Existing leases are considered a valid existing right and not subject to new decisions from the plan revision. In the future because nearly all the area is recommended for wilderness, availability of federal minerals is significantly restricted in Alternative 1. In Alternative 2 where roadless is recommended as wilderness, exploration development and production of oil and gas resources is foregone. No surface occupancy is implemented for new leases in the remaining acres, so though the possibility of exploiting oil and gas resources by directional drilling from offsite locations exists, exploration and development is hampered. In Alternative 3 roadless acres in 4.1, 4.2, 2.6, and 3.2 are leased with NSO. Again this would limit the opportunity to exploration development and production of oil and gas resources. Under Alternative 5 new leases would be issued under Standard Lease Terms with little restriction to oil and gas exploration and development.

Alternative 6 precludes leasing in recommended wilderness and allows no surface occupancy in areas currently not leased. The existing leases within the Table Top Unit would be reissued to allow surface occupancy for oil and gas exploration and development in areas not precluded by management plan direction. Road construction needed in conjunction with the continuation, extension or renewal of a mineral lease on lands would be allowed. This results in about 3,300 acres (the area mapped for terrestrial habitat and motorized recreation opportunities) with existing leases to allow for continuing mineral development in the future. Oil and gas activities in the remaining portion of the Appeal Settlement Zone would be limited by the lack of surface occupancy and the constraints of directional drilling from offsite locations. Again most opportunities to develop and utilize any oil and gas would be very limited or foregone because of inventoried roadless area protection.

In Alternative 7 about 20,400 acres of roadless is unavailable and 20,900 acres are leased with no surface occupancy. Within the areas leased with NSO, the opportunity for exploration, development and production of oil and gas resources would be constrained. Oil and gas development within the interior of large blocks of NSO would in all probability be foregone. On the remaining 27,000 acres oil and gas operations would be allowed with restrictions placed on them from other resource needs not roadless protection.

Leasing in Context with the 1994 Leasing Decision

Since the 1994 Leasing Decision is being incorporated into the Forest Plan Revision, the following table displays the total acres of federal minerals on the North Slope of the Uinta Mountains within the Wasatch-Cache proclaimed boundary that will be available for leasing.

Table OG-6. Acres of Federal Minerals Available for Leasing on the North Slope of the Uinta Mountains by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	*Alt 7*
Acres available for leasing within ASZ[1]	0	40,100	50,100	N/A	68,300	48,300	47,900
Acres available from 1994 Decision	140,400	140,400	140,400	140,400	140,400	140,400	140,400
TOTAL ACRES AVAILABLE	140,400	180,500	190,500	140,400	208,700	188,700	188,300

[1] Appeal Settlement Zone only
[2] N/A = not applicable because no decision is made

Table OG-7. Acres of Federal Minerals Available on the North Slope of the Uinta Mountains by Stipulation by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Available for Leasing	140,400	180,500	190,500	140,400	208,700	188,700	188,300
Available with Stipulations							
No Surface Occupancy	30,800	70,900	68,000	30,800	30,800	75,500	50,700
Surface Occupancy Allowed	109,600	109,600	122,500	109,600	177,900	113,200	137,600

Cumulative Effects

Nearby Oil and Gas fields

There are a total of 11 fields in Summit County with one on national forest (Bridger Lake). The fields on private land are located in far northwestern Summit County. Most fields have 2-6 active wells though the largest field, Anshutz Ranch East, has 47 wells. The majority of the fields have been in production for many years and there are ancillary facilities such as pipelines to assist in transporting the product (Chidsey, 1999). They are located far enough away from national forest lands to result in negligible cumulative effects.

North of the forest in Uinta County, Wyoming is also highly developed with oil and gas fields. There are 28 fields with a total of 474 wells.

Private Minerals

There are about 1,700 acres of privately owned minerals interspersed in the Appeal Settlement Zone. Within the Uinta Mountains there are 29,100 acres of private minerals under Forest Service managed lands. These minerals are not regulated by the Forest Service and may be developed by their owners at their discretion. Nearby leased federal minerals may facilitate development of private minerals.

Existing Leases

As explained earlier, a portion of the Appeal Settlement Zone is currently leased. There are additional federal minerals under lease yet not currently developed outside the area under analysis. Additionally, federal minerals are available for lease as a result of the 1994 Leasing Decision. The 1994 Leasing EIS (USDA Forest Service, 1994a) predicted a Reasonably Foreseeable Development Scenario total of 14 exploratory wells resulting in the possibility of two to three fields for the Wasatch-Cache portion of the Uinta Mountains. Some of this development is predicted for the Appeal Settlement Zone. Development of leases outside the Appeal Settlement Zone could result in 7 exploratory wells and one to two additional fields. This could result in additional miles of reconstructed or construction of new roads and well pads. One or two additional fields could be developed. The level of development predicted and associated effects are documented in the 1994 North Slope Oil and Gas Leasing Final Environmental Impact Statement.

Availability of Oil and Gas Resources

Where lands are administratively unavailable for oil and gas leasing or surface occupancy totally precluded by NSO and the lands have high potential for the occurrence for oil and gas resources, then that decision has greater potential impacts than if the lands have low potential for oil and gas resources. Since the lands covered in this forest plan revision on the North Slope of the Uinta Mountains all are classified as having high potential for the occurrence for oil and gas resources, any acreage removed from lease consideration may limit the further potential production of oil and gas.

Declining Domestic Production

A reduction in acres available for exploration on public lands nationwide would affect the domestic oil and gas industry and could further increase the dependency of the United States on foreign sources. A declining domestic oil and gas industry results in the loss of personnel with expertise in oil and gas exploration and development and affects the ability of the industry to respond to potential changes in the supply of imported energy. The industry has experienced such a decline during the last cycle of depressed oil and gas prices, but as prices have recovered over the last two years, the industry has faced staffing problems due to a reduction in the available of qualified exploration people. Alternative 5 would make the most acres available for leasing while Alternative 1 would eliminate all acres for leasing. Alternatives 2, 3, 6, and 7 would provide intermediate numbers of acres available.

Access

Access to leases across federal lands is controlled by land and resource management plan standards and guidelines. The standards and guidelines are not specifically included in oil and gas leases but apply to the lessee, as well as any forest user. Generally, when a stipulation is applied to a lease, similar or identical restrictions will apply to the placement, construction, and use of access roads, pipelines, and power lines.

Drainage – Loss of Revenue

Drainage occurs when oil and gas migrates within the subsurface from areas of high pressure to areas of lower pressure, such as is found in the vicinity of a producing well. Production of migrated oil and gas without compensation to the owner and/or lessee from whose estate the hydrocarbon moved is called drainage. The remedy of choice is often drilling and completing a producing well on the mineral estate losing hydrocarbons.

A federal oil and gas lease obligates the lessee to protect federal minerals outside the lease from drainage. Developing a well on the drained mineral estate is one method of drainage protection. Other protection may be achieved by including unleased lands in units, by communitization agreements, or assessment of compensatory royalties. However, if the federal mineral estate is not leased, the oil and gas may be drained and produced from adjacent non-federal lands or unleased federal lands without compensation to the federal government. Since these revenues would be shared with the state, drainage also means lost revenue to the state or county.

Drainage also affects revenues. Once a reservoir has been tapped, reservoir pressure drops off dramatically. Failing to maximize recovery could result in a loss of the resource. Development will not be efficient without all of the lands being leased and available for development. Maximum economic recovery could be diminished because any reservoir discovered may not be efficiently developed due to the fact that producing and/or injection wells may not be efficiently sited.

When lands are leased, the lessee can be required to protect the lease from drainage. However, when land is not leased, there is no means to protect from drainage. The potential loss of federal royalties caused by drainage from unleased lands is expected to be greatest in Alternatives 1 and 2 because no new leases would be issued in Alternative 1 and in Alternative 2, all lands would be stipulated NSO.

In summary, where the land is not leased or an NSO stipulation is applied, drainage of the subsurface oil and gas resource could occur, with a resultant possible loss in royalties and decrease in recovery efficiency.

Topic 10 – Fire Management

Introduction

Historically, and currently, fire has been and continues to be the main recurring disturbance factor in most of the Wasatch-Cache National Forest (WCNF) ecosystems. However, for the past 100 years, fire has been largely excluded from the forests, shrublands, and grasslands of the WCNF resulting in significant changes to many ecosystem components.

Laws, Policy, and Direction

The **Organic Administration Act** (1897) authorizes the Secretary of Agriculture to make provisions for the protection of national forests against destruction by fire.

The **Bankhead-Jones Farm Tenant Act** (1937) authorizes and directs the Secretary of Agriculture to develop a program of land conservation and land utilization to protect public lands.

The **Wilderness Act** (1964) authorizes the Secretary of Agriculture to take such measures as may be necessary in the control of fire within designated wilderness.

The **National Forest Management Act** (1976) directs the Secretary of Agriculture to specify guidelines for land management plans to ensure protection of forest resources.

The **Clean Air Act** (1977) provides for the protection and enhancement of the nation's air resources.

The **Federal Fire Policy** (1995) outlines policies on fire suppression and integrating fire on the landscape.

The **Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide** (1998) covers the process for making fire suppression decisions, prescribed fire burn plans and implementation, and wildland fire use planning and implementation.

Protecting People and Sustaining Natural Resources in **Fire-Adapted Ecosystems: A Cohesive Strategy for** (USDA, 2000) describes fuel treatment priorities for federal lands.

A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10-Year Comprehensive Strategy (USDA, USDI 2001) and **Implementation Plan** (2002). The Departments of Interior and Agriculture collaborated with the western Governors to develop a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on federal and adjacent State, tribal, and private forest and range lands in the United States. The primary goals of the 10-year Comprehensive Strategy are: 1) Improve prevention and suppression, 2) Reduce hazardous fuels, 3) Restore fire-adapted ecosystems, and 4) Promote community assistance.

The **Utah Fire Amendment** (USDA Forest Service, 2001) amended all of the Forest Plans for the Utah National Forests to allow for prescribed fire and wildland fire use. Prescribed fire was authorized in all places following site-specific environmental analysis. Wildland fire use was authorized Forest-wide following the Fire Management Plan with the following exceptions: administrative sites; developed recreation sites; summer home sites; designated communication sites; oil and gas facilities; mining facilities; above-ground utility corridors; high-use travel corridors; and sensitive watersheds.

The WCNF has elected, in this Forest Plan, to follow the decisions, and standards and guidelines, covered in the Utah Fire Amendment with one exception – the WCNF may allow wildland fire use in sensitive watersheds. The WCNF would prefer to do fire planning for specific sites to determine whether to include portions of "sensitive watersheds" (as defined in the Utah Fire Amendment) in areas approved for wildland fire use. For example, an acceptable wildland fire use perimeter may include portions of sensitive watersheds if a barrier to fire spread is included in the sensitive watershed. Until more site-specific analysis is completed (as areas are approved for Widland Fire Use in the Fire Management Plan), the WCNF will not implement landscape-level wildland fire use prohibitions in sensitive watersheds

Forest Service Manual and Handbook direction provide additional guidance for fire management activities.

Several layers of fire management related documents guide Forest Service actions. The WCNF Fire Management Plan (FMP) is a broad level *plan governing fire management actions* that is reviewed annually and revised as needed to reflect the Forest Plan and changes in the fire management program. The FMP*, based on guidance and direction in the Forest Plan, provides detailed information* for wildland fire use, fire suppression, prescribed fire, and hazardous fuels treatment. Content in the FMP is available to the line officer, *fire manager*, and fire incident commander, prior to future planned (prescribed *fire, mechanical treatment*) and unplanned (wildland fire) fire management activities so they can appropriately address resource and social concerns. Examples of measures that could be implemented to protect resources include: restrictions on *prescribed* burn *severity and size*, restrictions on the timing of fire use, restrictions on areas where burning activity would not be allowed, and guidance on where mechanical fire suppression activities would be limited.

Other specific documents *that are related to fire management activities* include the prescribed fire burn plan, wildland fire use plan, wildland fire implementation plan and the wildland fire situation analysis. These are fire management implementation documents for planned (prescribed) and unplanned (wildland fire) ignitions. They incorporate relevant measures and procedures from the fire management plan and apply them to site-specific, on-the-ground activities and actions. This tiering ensures that the prescribed fire and wildland fire actions will consider, incorporate, and be consistent with relevant Forest Plan management direction requirements.

Affected Environment

Fire Occurrence

Fire occurrence records from 1970 to 2001 were analyzed for the following statistics. Of the almost 2000 fires recorded in the WCNF's fire occurrence database from 1970 to 2001, two-thirds of the fires (63%) are human-caused. The rest (37%) are started by lightning. The WCNF averages about 60 wildfires per year; the fewest recorded, was 13 fires in 1984; and the years with the most fires were 111, (1979), 110 (2000) and 96 (2001). The average fire size is 40 acres. Most fires are extinguished at 0.1 acres in size and 70% of the fires are < 1 acre. The largest fire recorded since 1970 burned 14,200 acres in June of 2002 named the East Fork Fire near Bear River, Utah. According to the fire statistics, the number of large fires appears to be increasing -- 90% of the fires >100 acres have occurred since 1980. Fire seasons of 2000, 2001 and 2002 were some of the busiest on the WCNF in terms of number of fires and total acres burned.

Prescribed Fire

The use of prescribed fire on the WCNF has been very limited in the past. For the past three years, the WCNF has prescribed burned approximately 1,250 acres per year, primarily in aspen stands.

Wildland Fire Use

Wildland fire use, only allowed after completion of a wildland fire use plan within in the FMP, is currently only allowed in one Wilderness Area in the WCNF: The High Uintas. Wildland fire use plans have been in effect in these two Wilderness Areas since 1998; and since then the WCNF has not managed any ignitions as wildland fire use. The Forest Service intends to prescribe appropriate wildland fire use during upcoming revisions of the Fire Management Plan. Wildland fire use plans may cover non-Wilderness lands as well as designated Wilderness areas. Upcoming revisions will include wildland fire use plans for the Deseret Peak, Mt. Naomi, and Wellsvilles Wildernesses and *surrounding areas* within the next 3 years. Wildland fire use plans for the other Wilderness areas will be developed within the next 5 years.

Fuels in the Wildland-Urban Interface

In the last ten years there has been a tremendous increase in the development and population adjacent to the Wasatch-Cache and Uinta National Forest boundary along the Wasatch Front. Soaring populations coupled with the increased use of national forest land has increased the risk and frequency of fire. Compounding the situation is the presence of vegetative communities with uncharacteristically high fuel loading. This situation can support severe fires which can result in significant impacts to properties and natural resources

Given this situation and the current national emphasis on reducing fuels in the wildland-urban interface, the WCNF, in conjunction with the Uinta NF, recently completed the Wasatch Front

Fuels Assessment Report (USDA Forest Service 2002). The Assessment analyzed the fuel situation and reduction opportunities on over 400,000 acres along the Wasatch Front. It is anticipated that the Fuels Assessment will guide site-specific planning to reduce fuels along the Wasatch Front.

The predominate cover class within the assessment area was oakbrush/shrub. Over 83 percent of the oakbrush/shrub cover class was classified as medium (62.6 percent) to high (20.8 percent) density. About half of the assessment area is classified as a medium/high, high, or very high fuel hazard. The oakbrush/shrub cover class dominates this area on the Wasatch-Cache.

Several areas along the Front were identified as having higher opportunities and needs for treatment. These areas include the cities and towns of North Ogden, Ogden, South Ogden, Bountiful, North Salt Lake, Sandy and Draper. Portions of the some of the canyons, specifically Parley's Ogden, Little Cottonwood were also labeled high treatment opportunity. Emigration Canyon in particular had the most classified as the highest treatment opportunity.

The WCNF has implemented few projects aimed at reducing hazardous fuels. No mechanical treatments have been initiated for the purpose of reducing high fuel loading. However, that is likely to change within the near future because of increased national emphasis on fuel reduction in the widland-urban interface.

Fire Regimes and Condition Classes

The ecosystems of the WCNF fall within a variety of fire regimes. Tables FM-1, FM-2, and FM-3 describe and categorize the fire regime and condition class as well as the condition classes of vegetation types that comprise 5% or more land cover on the WCNF.

Table FM-1. Fire Regime Definitions

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0 – 35 Years	Low Severity
II	0 – 35 Years	Stand replacement severity
III	35 – 100+ Years	Mixed severity
IV	35 – 100+ Years	Stand replacement severity
V	>200 Years	Stand replacement severity

Fire regime and condition class definitions were adapted from the FS publication, "Protecting People and Sustaining Resources in Fire-Adapted Ecosystems: A Cohesive Strategy" (April, 2000). As stated in the Cohesive Strategy, treatment efforts should be concentrated in the shorter interval fire-adapted ecosystems (Fire Regimes I and II) that are in Condition Classes 2 and 3. This emphasis generally agrees with treatments aimed at achieving properly functioning conditions.

Table FM-2. Condition Class Definitions

Condition Class 1	The disturbance regime is largely intact and functioning. The effects of insects and disease as well as the potential intensity and severity of fire are properly functioning. Vegetation components are resilient to disturbances from wind, insects, disease, or fire and do not predispose the stand or its key components to a high risk of loss. *Note that currently none of the vegetation types on the WCNF are classified as this condition class.*
Condition Class 2	Moderate alterations to the historic disturbance are clearly evident, such as one or more missed fire return intervals. The effects of insects and disease as well as the potential intensity and severity of fire pose an increased threat to key components that define the system. Composition and structure of vegetation has shifted towards conditions that are less resilient and are therefore more at risk to loss from wind, insects, disease or fire.
Condition Class 3	The disturbance regime has been significantly altered. The effects of insects, disease, or fire may cause significant or complete loss of one or more defining ecosystem components. The highly altered composition and structure of the vegetation predisposes the stand or ecosystem to disturbance events well outside the range of historic variability, potentially producing changed environments never before measured.

Table FM-3. Vegetation on the WCNF by Fire Regime and Condition Class[1]

Vegetation Type	Acres	% of Forest	Fire Regime	Condition Class
Aspen, Aspen-Conifer, Conifer-Aspen[2]	205,600	17%	II, III, IV	3
Sagebrush	189,600	15%	II	2, 3
Engelmann Spruce and Subalpine Fir	153,400	12%	V	2
Mixed Conifer[3]	151,700	12%	III, V	2
Barren Land	101,500	8%	n/a	n/a
Oakbrush-Maple	90,800	7%	II	2, 3
Douglas-fir	87,500	7%	I, III	3
Pinyon and Juniper[4]	79,000	6%	II, V	3
Lodgepole Pine	61,300	5%	IV, V	2

[1]*Determinations of the fire regime and condition class were derived from professional expertise of the Plant Ecologist (Padgett) and Fire Ecologist (Pollet) and content found in the following two references: Fire Ecology of Forests and Woodlands in Utah (Bradley et al. 1991) and Fire Effects Information System (USDA Forest Service 2002).*

[2] Aspen , Aspen-Conifer, and Conifer-Aspen fall within fire regimes II, III, and IV, depending on the location of the aspen. Aspen occupies a wide ecological amplitude on the WCNF, and its historical fire regime is closely related to its neighboring vegetation. For example, where aspen is situated near sagebrush, it would have a more frequent fire return interval compared to the fire return interval of aspen located near spruce/fir forests.

[3]Mixed Conifer includes both the Bear River Range (lodgepole, Engelmann spruce, and subalpine fir) and Uinta Mountains (lodgepole, Engelmann spruce, subalpine fir and Douglas-fir). The historical fire regime in the WCNF's mixed conifer was likely more frequent mixed-severity fires coupled with infrequent stand-replacement fires.

[4]The historical fire regime for continuous cover of pinyon juniper with a grass/shrub understory was fairly frequent, preventing establishment of large trees. However, in rocky, generally unvegetated areas where trees were able to get established, some juniper trees were able to grow quite large with the lack of fire. In these vegetatively isolated pockets, fire was extremely infrequent.

Environmental Consequences

General Effects

Congress and federal land management agencies have recently spotlighted fire management policies and practices; this attention resulted from several severe fire seasons in the west starting in 1994 through 2002. Emerging national direction and policy emphasize increased fire suppression resources, fuel treatment, and fire restoration on the landscape. 2001 was the first year of substantially increased funding and personnel. It is unclear if this level of commitment and emphasis will be stable for the life of the Forest Plan, or if it will fluctuate. Discussion of effects for alternatives will assume a stable (based on 2001 and 2002 budgets) funding strategy for fire suppression, hazardous fuel treatment, wildland fire use, and prescribed fire.

Challenges to achieving landscape-level fuels reduction programs and prescribed fire programs may include: funding uncertainty, species at risk management, lack of experience and personnel for fire management project planning and implementation, potential for noxious weed invasion, sensitive watershed concerns, scenery resource concerns, smoke production, and dense human populations in and surrounding the forest. These challenges vary slightly among all alternatives and differences among alternatives are highlighted under specific effects and cumulative effects.

It is difficult predict with any degree of certainty the future frequency and size of unwanted wildland fires and wildland fire use. Generally, effects on fire management related to these unplanned ignitions do not vary widely among Alternatives 2 through 7. Exceptions are noted under specific effects and cumulative effects.

Effects are discussed in terms of the four aspects of the Fire Management Program: 1) fuel treatment to reduce hazardous fuel loadings; 2) prescribed fire for ecosystem benefit; 3) wildland fire use for resource benefit; and 4) fire suppression.

Effects on Fire Management from Roads and Access Management

Historical fire data show that the largest numbers of fires that occur on the Forest are along travelways, and primarily adjacent to roads. Alternatives 3, 4 and 5 would have the greatest potential for effects on fire management. Alternative 5 allows the greatest number of new roads (more than 60 miles) and Alternatives 3 and 4 allow nearly 50 miles of new roads. Alternatives 6 and 7 would have a significantly lower potential for effects on fire management. These alternatives allow between 12 and 15 miles of new roads. Alternative 2 would have a lower effect on fire management, allowing 9 miles of new and closing 7 miles of existing roads. Alternative 1 would have the least potential for effects on fire management. This alternative allows for 3 miles of new roads, but closes 76 miles of existing roads.

Effects on Fire Management from Timber Harvest

Table VEG-4 lists the number of acres treated through timber harvest and various other activities that will affect fire management activities. Timber harvest can create additional concentrations of activity fuels and increase the risk of ignition potential from the increased activity in the area,

such as chainsaws, and motorized equipment. Increased numbers of openings resulting from timber harvest can reduce fire's ability to transition from a surface fire to a crown fire and can reduce spread rates and spread distance. Timber harvest can reduce fuel loadings substantially in areas where natural fuel loadings are excessively high. However, timber harvest can also create additional activity fuels which if not treated properly under a slash disposal program can lead to higher fuel loadings over a given area and subsequently increase the threat of ignition and hazard.

In Alternative 1 where timber harvest is not allowed, there would be less activity fuel build-up. However, natural fuels would continue to accumulate and some fires may increase in size and intensity to an extent that initial attack success would be low. In addition, as timber stands age and become more decadent, the threat of large stand replacing fires becomes more likely. These types of fires create more risk to firefighters, the public, and adjoining high-value resources (developed areas, wildland-urban interface areas, plantations, etc.).

Alternative 5, allows for the harvest of the greatest amount of timber, with Alternative 4 harvesting nearly as much. Age class diversity, as a result of timber harvest, would be increased over the landscape, reducing the potential of large-scale, stand-replacement wildfires. However, Alternatives 4 and 5 would constrain fire use activities within suitable timber areas (prescription 5.2). Limiting prescribed fire (as described in Alternative 1, and to a lesser degree in Alternatives 4 and 5) would result in higher fire hazard and trends away from proper functioning condition for those areas except where they are treated by mechanical means. Alternatives 2, 3, 6 and 7 describe a combination of timber harvest, prescribed fire, and mechanical fuel reduction placing their effects between effects described for Alternatives 1 and 5. Alternative 2, as shown in Table VEG-4, treats the greatest number of acres using prescribed fire, more than twice the acres of Alternatives 3, 6, and 7, over four times that of Alternative 5 and more than 6.5 times that of Alternative 4.

Effects on Fire Management from Vegetation/Fuel Treatment

For the purposes of the following discussion, prescribed fire, vegetative treatments, and mechanical treatments (Table FM-4 from Table 2-2) are included as vegetation/fuel treatment. Table FM-4 summarizes the acres of vegetation/fuel treatment (as defined in this discussion) by alternative.

Alternative 1 has no vegetation/fuel treatment, but there would still be effects. Without any management-implemented vegetation/fuel treatment, the amount of biomass available to burn would increase potentially resulting in larger, more severe wildland fires. This situation would cause the most safety problems during active fires for firefighters and the public.

Alternative 2 has the greatest amount of acres treated. Based on the design of these vegetation/fuel treatments to move landscapes toward PFC, the risk of large, severe wildland fires would be reduced in areas where these treatments occur.

Table FM-4. Acres of Vegetation/Fuel Treatment by Alternative

Vegetation Treatment Types	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	Vegetation Treatments (Total acres treated during 10-year planning period)						
Prescribed Fire- Aspen & Aspen/Conifer Mixed[2]	0	80,000	32,000	7,200	7,200	32,000	32,000
Aspen/Conifer Vegetative Treatment[2]	0	6,500	5,250	6,250	3,100	3,000	5,000
Aspen/Conifer Commercial Harvest (acres) from MPC 5.2[2]	0	0	2,250	6,250	12,400	2,000	3,500
Prescribed Fire- Douglas-fir (non-lethal) [2]	0	4,000	2,000	0	0	2,000	2,000
Prescribed Fire- Sagebrush[9]	0	40,000	20,000	10,000	10,000	20,000	30,000
Mechanical Treatment- Oak[2]	0	16,000	8,000	0	8,000	8,000	20,000
Prescribed Fire- Oak[2]	0	40,000	20,000	8,000	20,000	20,000	8,000
Total Vegetation/Fuel Treatment Acres	0	186,500	89,500	37,700	60,700	87,000	100,500

Alternative 7 would treat more than half the acres of Alternative 2 and slightly more than Alternatives 3 and 6. Alternatives 3, 6, and 7 would have an intermediate effect on reducing fuels and, therefore on reducing the risk for uncharacteristically large and severe wildand fires. Alternative 5 is treats about 32 percent of the acres treated in Alternative 2 and about 60 percent of the acres treated in Alternative 7. Many vegetation/fuel treatments would be focused in populated areas and the risk to firefighters and the public would be mitigated in areas where treatments have occurred.

Alternatives 4 has fewer acres of vegetation/fuel treatments that all alternatives that treat vegetation. Where treatments do occur, the risks to firefighters and the public would be lessened and fires would be smaller and less intense than in those places where fuels were not treated. Fewer acres would be treated, however, so the benefits of fuel treatments would be less than Alternatives 2, 3, 5, 6, and 7, which all have significantly more acres treated.

Effects on Fire Management from Recreation

Undeveloped recreation can affect the fire management program both positively and negatively. As human use increases on the Forest, more people will be on hand to report fires that may normally go undetected for some time. With increased use, however, there will also be an increase in the incidence of human-caused wildfires.

Alternatives 3 and 5 increase recreation access opportunities compared to the other alternatives. Under these alternatives, human use will increase and therefore both fire detection and human-caused wildfires will likely increase. The other alternatives are all very similar in terms of effects from recreation and would likely have fewer human-caused ignitions than Alternatives 3 and 5.

Effects on Fire Management from Wildlife Management

Alternatives with more acres emphasized for wildlife habitat may affect fuel treatment and prescribed fire activities. The objectives for wildlife habitat may conflict with fuels reduction or fire management objectives. More acres of wildlife management habitat emphasis may result in more resource conflicts; modification of treatment types or intensity; or mitigation of treatment effects. Alternatives 3, 6, and 7 have the most acres designated as terrestrial habitat emphasis and would result in the most potential conflicts. Alternatives 4 and 5 have the fewest acres emphasizing terrestrial habitat and would have less potential conflicts. Alternatives 1 and 2 would have moderate potential conflicts.

Managing species at risk (SAR) poses significant constraints for fire management in terms of precluding treatments in an area that may negatively impact SAR habitat. However, most native wildlife species evolved with recurring fire and fire generally benefits wildlife habitat in the long-term. If certain vegetation treatments (prescribed fire, wildland fire use, and mechanical treatments) are prohibited over large areas due to TES concerns, greater risk of stand-replacement unwanted wildland fire will result due to more continuous fuels and higher fuel loading. This may result in a complete loss of habitat in an area for some SAR.

Prescribed fire, fuel treatment, suppression actions, and wildland fire use may need to be modified if they occur near habitat for species at risk or big game winter range. The effects of these modifications wouldn’t change across the alternatives.

Effects on Fire Management from Aquatic and Semi-aquatic Species Management

Alternatives with more acres emphasized for aquatic habitat/watershed emphasis may affect fuel treatment and prescribed fire activities. The objectives for aquatics/watersheds may conflict with fuels reduction or fire management objectives. More acres of aquatic/watershed habitat emphasis may result in more resource conflicts, modifications of treatment types or intensity, or mitigation of treatment effects. Alternatives 3, 6 and 7 have the most acres emphasizing aquatic/watershed and would result in the most potential conflicts. Alternatives 4 and 5 have the fewest acres emphasizing aquatics/watershed and would have less potential conflicts. Alternatives 1 and 2 would have moderate potential conflicts.

Prescribed fire, fuel treatment, suppression actions, and wildland fire use may need to be modified if they occur near habitat for species at risk or in riparian areas. The effects of these modifications wouldn’t change across the alternatives.

Effects on Fire Management from Soil and Water Resources Management

Under all alternatives, fire management may be affected by Forest Plan soil and water standards and guidelines, water bodies that are listed as impaired by Utah, and implementation of best

management practices (BMPs). Standards and guidelines under the section, Watershed, Riparian, and Aquatic Health contain several items that may preclude the use of fire or affect the amount of work needed to implement a prescribed burn or wildland fire use project. For impaired water bodies, projects that may increase the parameter that is causing the impairment will not be allowed unless it can be ascertained that no increase in that parameter will result from the project. Depending upon the issues of concern, BMPs may limit the extent or the timing of fire management projects or may require actions that will mitigate adverse effects of the fire management project.

Effects on Fire Management from Air Quality

Air quality laws pertaining to smoke affect prescribed fire and wildland fire use activities. Prescribed fire and wildland fire use activities may need to be altered or mitigations employed to comply with air quality rules and regulations. Alternatives 2, 3, 5 and 6 have the most acres planned for prescribed fire and would be most affected by smoke management regulations. Alternative 1 would likely have the most acres burned in wildland fire use and may be also affected by smoke management regulations. Alternatives 4 and 5 would be least affected.

Effects on Fire Management from Special Designations

In RNAs, certain fire management activities are not allowed or may be constrained -- fuel treatments are not allowed, and wildland fire use and prescribed fire may be allowed only to meet specific resource considerations. Fire suppression tactics may need to be modified in RNAs. Acres of designated RNAs is highest in Alternatives 1, 2, 4, 6 and 7 and constraints on fire management activities would be applied to more acres compared to Alternatives 3 and 5 that have fewer acres designated as RNAs.

In Special Interest Areas or Special Areas, fire management actions should help perpetuate the unique ecosystem. Fuel treatment or prescribed fire may be accomplished for hazardous fuel reduction if it is compatible with the unique ecosystem. There may be constraints on fire management actions within these special areas. Alternatives 1, 2 6, and 7 have the most acres designated for Special Interest Areas or Special Areas and would have the most areas of constraints. Alternatives 3, 4 and 5 have the least acres designated and the fewest areas of constraints due to Special Interest Areas or Special Area designations.

Effects on Fire Management from Livestock Grazing

Livestock grazing concerns could significantly constrain fire management activities. Livestock grazing affects the amount of fuel available to burn in a wildland or prescribed fire. Intensive grazing in an area reduces the amount of fine fuels available to carry a surface fire possibly resulting in more successful fire suppression efforts. However, this becomes a disadvantage during prescribed burning when the fine fuels necessary to carry a lower-intensity fire are not available.

Grazing may affect prescribed fire in several ways: grazing may need to be deferred one or more years prior to prescribed fire to build up grass fuels necessary to carry a fire; and grazing will be

deferred for two growing seasons following prescribed fire to allow proper regeneration of native grasses and forbs.

Most of the grazing within allotments is in sagebrush and aspen fuel types. Therefore, the greatest impact to the fire management program from grazing will be in these fuel types. Effects from grazing will be the least in Alternative 1 since no fire management activities except wildland fire use are allowed. Effects from grazing would be related to the total amount of prescribed fire planned, with more effect when more acres are planned for burning. Coordination between planned prescribed burns and annual livestock grazing operations will need to be intensive. The most difficult to implement is Alternative 2 because it includes the highest acreage (12,000 acres annual average) of prescribed fire in these vegetation types. Alternative 7 includes this need for intensive coordination and management on 6,200 acres having a higher probability of success because of less total acres. The relative probability of success is directly related to total acres. Alternatives 3 and 6 have 5200 acres, and Alternatives 4 and 5 have 1720 acres.

Effects on Fire Management from Noxious Weed/Invasive Annual Plant Establishment

Noxious weed and invasive plant concerns can significantly affect fire management activities. In areas infested with noxious weeds or invasive annual grasses (cheatgrass or medusa head), wildland fire is often undesirable. The presence of noxious or invasive plants in an area may preclude prescribed fire or wildland fire use (or mechanical treatment in some cases) in that area if increased invasion of unwanted species is likely. Fires typically occur more frequently and burn larger in areas infested with invasive annual grass than in native vegetation. Currently, there are few feasible methods of controlling noxious weeds or invasive annual plants over large areas.

Noxious weed and invasive plant control do not vary by alternative; therefore the effects on fire management are similar for all alternatives.

Effects on Fire Management from Oil and Gas Management

Wildland fire use is not authorized in areas where oil and gas facilities are located. An appropriate management response will protect these areas is they are threatened. Prescribed is allowed only if compatible with oil and gas production. Alternative 5 has the greatest probability of these facilities being threatened because it has the greatest area available for leasing and consequently the greatest potential for facilities. Alternative 1 has the smallest probability.

Effects on Fire Management from Scenery Management

Fire management activities may be constrained by scenic resource concerns, especially in sensitive areas such as along primary and secondary travelways and use areas and along the Wasatch front. Scenic resource concerns may result in more costly management actions; for example, feathering edges or following natural features for fuel breaks is more expensive than a

linear fuel break, and smaller prescribed burn projects diminish the economies of scale inherent in larger projects. Scenic resource concerns affect all alternatives similarly.

Effects on Fire Management from Wilderness Management

Wilderness (prescription 1.1-1.4), recommended wilderness (prescription 1.5) is conducive to managing natural fuels using wildland fire use. Prescribed fire may be used in wilderness only to meet specified wilderness objectives; by contrast, prescribed fire may be used in recommended wilderness as long as it does not result in long-term changes to the wilderness character. To employ wildland fire use, the areas must be large enough for naturally occurring fires to fulfill their role in the ecosystem and reduce the risk of fire burning in areas where wildland fire may not be desirable (private property, developed recreation sites, sensitive watersheds). In wilderness and recommended wilderness, mechanical treatments and timber harvest are not allowed which may increase risk of high-intensity unwanted wildland fires – especially in the wildland-urban interface.

Alternatives 1 and 2 have the most acres for Wilderness and Recommended Wilderness, followed by Alternatives 6, 7, 3, 4 and 5. Alternatives 1 and 2 would employ more wildland fire use, but fires can be expected to be larger under these alternatives. Alternatives 4 and 5 would likely have more prescribed fire and mechanical treatments, which would reduce potential for large, severe wildland fires. Alternatives 6, 7 and 3 would have effects between Alternatives 1 and 5.

Effects on Fire Management from Roadless Area Management

In Alternatives 1, 2 and 6 that apply the Roadless Area Conservation Rule, prescribed fire and wildland fire use will be the favored treatment for ecosystem benefit and hazardous fuels treatment over mechanical treatment in inventoried roadless areas. Fire suppression will likely not be affected among the alternatives due to the relationship of human-caused ignitions and access. For example, as access to the Forest increases, the number of human-caused fire starts increases, but reporting increases and the ability for fire suppression resources to access an area increases. Conversely, as access to the Forest is limited, the number of human-caused starts decreases, but the ability for fire suppression resources to access an area also decreases.

Cumulative Effects

Table VEG-4 shows that Alternative 1 allows no treatment of vegetation (prescribed fire, timber or other mechanical methods), which will result in the greatest potential for fuels build up. Alternative 2 allows the greatest amount of all vegetation treatments. Alternative 4, while allowing the greatest amount of timber harvest, treats the least total acres because relatively few acres are treated through prescribed fire. As noted in Table VEG-6, the VDDT model identified Alternative 1 as having the potential to burn the most acres of aspen, and conifer through failed fire suppression. Alternatives 4 and 5 would have the potential to have the fewest acres burned through failed fire suppression. Alternatives 2, 3, 6, and 7 all had the potential to burn about one third the acres of Alternative 1 through failed fire suppression, and half again as many acres as

Alternatives 4 and 5. The cumulative effects discussion for fire management is divided into the four fire management activities (fuel treatments, prescribed fire, wildland fire use, and fire suppression) and a discussion on development in the wildland-urban interface.

Fuel Treatments

The potential for wildland fire is measured in terms of fire hazard and resistance to control. Wildland fire hazard can be defined by age, vegetation structure, vegetation density, vegetation amount and the proximity of this vegetation to high value areas. The relative degree of fire hazard is also related to the ability to use treatments that manipulate fuel-loading amounts resulting in desired fire behavior and effects. Prescribed fire, wildland fire use, timber harvest and mechanical treatments are all ways to manage fuel reductions. For alternative comparisons, fuel hazard may be increased in areas where fuel reduction actions (prescribed fire, mechanical treatment, timber harvest, wildland fire use) are constrained. Examples of management direction that constrains fire hazard reduction include: wilderness, recommended wilderness, and undeveloped area prescriptions precluding mechanical treatment; timber emphasis areas precluding prescribed fire; and areas precluding wildland fire use. These vary in both total acreages and location of those acres by alternative. It is assumed that reducing fire hazard will eventually lead to a reduced large wildfire occurrence and related expenditures.

Alternative 1 allows no hazardous fuels reduction treatments except wildland fire use. This alternative is questionable in its ability to achieve desired results from large wildland fires. In terms of safety and property protection, it is generally safer and less costly (for firefighters and the general public) to suppress fires in the initial stages rather than attempting suppression on large, high-intensity wildfires that are imminently threatening public safety and property. Alternative 1 would result in some natural fuels reduction if wildland fires were allowed to grow large. Without treatments placed strategically on the landscape, however, hazardous fuels reduction in critical areas (i.e., urban wildland interface) will be minimal resulting in increased risk of large, high severity wildland fires.

Among the other action alternatives (2 through 7), strategically situated mechanical and prescribed fire treatments will allow reductions in the most hazardous fuel accumulations. Wildland fire use is allowed under all alternatives (although limited in some alternatives), but it will not be the best tool for reducing hazardous fuel accumulations due to the unpredictable nature of lightning-caused ignitions.

Prescribed Fire

The potential for prescribed fire for ecosystem restoration and maintenance is dependent upon management area prescriptions and desired future conditions, the type of vegetation, and priorities for funding. The amount to be treated annually is difficult to predict due to a myriad of factors that must be considered. The WCNF's inexperience in undertaking large-scale, stand replacement prescribed fires in the forested cover types, unreliable prescriptive windows during the late summer/early fall, and the availability of adequate resources to complete these projects may influence the activities completed on an annual basis over the several years. In all alternatives (except Alternative 1, but emphasized in Alternative 2), the intent is to build

experience in prescribed burning over the planning period so that as skills are gained, learning can be used to increase the acreage treated in later years.

Alternatives that include substantial amounts of prescribed fire will result in trends leading toward properly functioning conditions and reduced hazardous fuel conditions. No prescribed fire is allowed in Alternative 1. Although Alternative 1 does not include prescribed fire, the use of fire on the landscape may result in trends toward properly functioning conditions in that alternative. The most active and liberal prescribed fire program is in Alternative 2, followed by Alternatives 3, 6 and 7. Alternative 2, and Alternatives 3, 6 and 7 to a lesser degree, would most quickly achieve trends toward proper functioning condition and reduced risks of unwanted wildland fires. Alternatives 4 and 5 limit prescribed fire in timber emphasis areas (prescription 5.2).

Wildland Fire Use

Prediction of acres of wildland fire use by alternative is not possible. Seasonal weather and climatic factors, combined with budgetary and organizational constraints, would make any comparison generic and invalid. Across all alternatives, wildland fire use is also not allowed in the following management prescriptions: 4.5 (developed recreation areas); and 8.1 (oil and gas or other mineral production sites).

Other than the above-mentioned areas, wildland fire use will be considered across the rest of WCNF. Site specific plans for wildland fire use events are developed as events take place. Once wildland fire use is approved in the Fire Management Plan for an area, that does not mean that every natural ignition will managed in that way. For each ignition, a decision will be made whether to suppress or manage as wildland fire use. It is unlikely that ignitions that have potential to become large, high severity fires that threaten public safety or private property will be managed as wildland fire use.

A general assumption is that wildland fire use will be greatest in Alternative 1 (since it is a natural process in vegetation). Alternatives 2, 3, 4, 6 and 7 will equally allow wildland fire use on most areas of the WCNF. Alternative 5 also limits wildland fire use in management prescription 5.2 (timber emphasis). As stated previously, it is impossible to assign acres of wildland fire use across alternatives.

Wildland fire use implementation will result in conditions moving toward PFC and reduced hazardous fuels accumulations. The negative effects may include: increased erosion potential following fire, displaced recreation, displaced grazing, noxious weed invasion, and smoke.

Fire Suppression

The effects of fire suppression are generally long-term. The problems associated with years of fire suppression policies went unperceived for many years. Forest managers and researchers now have realized that suppressing fires has resulted in many undesirable vegetation changes that eventually lead to even more uncontrollable wildfires or undesirable changes in vegetation patterns in the future. Aggressive fire suppression is essential where life, safety and valuable

resources are at risk, however, there are trade-offs in terms of future fire suppression efforts and ecosystem health.

Under all alternatives, fire starts that are not managed as wildland fire use will be managed using the appropriate management response based on safety and values at risk. All non-lightning caused fires will be managed as unwanted wildland fires, even in areas identified for wildland fire use. Alternative 1 may result in less aggressive fire suppression actions in situations where a wildland fire poses little risk to life or property. Alternatives 2 through 7 are similar in terms of fire suppression.

Special Problems Associated with Development in the Wildland-Urban Interface

Increased development near the Forest boundary, often referred to as the wildland interface, affects the fire management program in several ways. The need for fire suppression resources increases due to the high values at risk (i.e., densely populated subdivisions) from a fire burning out of the Forest onto private lands. The need for fuels management (primarily mechanical treatment) along the Forest boundary increases both to reduce the risk of a fire leaving the Forest, and to reduce the risk of a fire on private property entering the Forest. Using prescribed fire or wildland fire use to reduce fuels may be severely constrained near the interface due to the relatively high risk of an escape onto private property and high values at risk. Wildland fire use opportunities will be limited near the populated areas along the Forest boundary.

Increased urbanization along the Forest boundary presents many challenges for fire management. However, increased urbanization does not vary among the presented alternatives and the effects on fire management will likely be similar for all alternatives.

Heritage Resources

Introduction

Heritage resources are both the physical remains of, and knowledge about, past human activity on the Wasatch-Cache National Forest. They include archaeological sites, artifact and historic document collections, rock art, Forest administrative buildings, traditional plant gathering and ceremonial places, and human-altered landscapes (including tie hacking and mining districts). Heritage resources are managed within the context of overall Forest management for the long-term benefit of all Americans. This benefit can be realized through such things as scientific study of past human activities and past environments, traditional use by American Indians, and development of interpretive sites where people can see, and appreciate, the diversity of past Forest use. Most fundamentally, public benefit comes through maintenance of the sites themselves. Absent any land management conflicts, preserving important sites in place, in good condition, is the overall goal of heritage resource management. This can be achieved by protecting them from adverse management activities (or mitigating adverse effects, to the greatest public benefit), vandalism, weathering, alteration of their settings, and other processes that cause them to deteriorate to the point of losing their value. In this way, they stand as a legacy for the future.

People have been using the Wasatch-Cache National Forest and adjacent valley areas for over 8,000 years. The story of this use is important for many reasons. American Indian sites are valued for both their ability to teach us about how these past peoples lived, and to help Indian peoples today connect with their ancestors and to maintain cultural and religious traditions. Historic sites (which date to about the last 150 years) constitute the most visible connection to past peoples on the Forest, and are valued both for their ability to enrich local family and community history, and for their contribution to our understanding of environmental change since European-American settlement. For example, past activities, such as water diversion, exclusion of fire, logging, and over-grazing around the turn of the century, have caused changes to Forest biotic communities that continue today. Knowing when and how these changes occurred helps to create more effective management actions today.

Heritage resources may be affected by activities that adversely affect (either directly or indirectly) the character-defining features of significant (National Register Eligible) sites. (These features can include its soil matrix (containing artifacts and features such as hearths, trash deposits, etc.), standing structures, surface artifact scatters, etc. In general, this means the greater the extent of ground disturbing management activities, the greater the potential for adverse effects. However, other activities on the Forest, such as illegal off-road vehicle use, can adversely affect sites as well.) The potential for ground disturbing activities varies some by alternative and will be addressed in this analysis.

Management activities may also be conducted which benefit the long-term preservation and appropriate use of heritage sites. (These activites include locating, documenting, and evaluating the importance of sites (most commonly through determination of their eligibility for the National Register of Historic Places). We cannot effectively manage sites unless we know where, and what, they are. They also include actions such as stabilizing log structures, moving

trails or roads that run across sites, and appropriately using sites. These uses include enhancing visitor's understandings of the past (through research or interpretation), saving sites as protected features for the future, or ensuring that American Indians can continue traditional uses of sites.) This section addresses the potential of alternatives to benefit our use and understanding of heritage resources.

Laws, Policy and Direction

- The National Historic Preservation Act of 1966 (as amended) is the primary law that guides management activities (36 CFR 800). It requires Agencies to take into account the affect of other management activities on heritage resources (Section 106). It also requires development of long-term management plans that locate and protect heritage sites, and then integrate sites and information into overall agency programs and goals (Section 110). The implementing regulations for Section 106 were amended in 1999 (and revised in 2000), and require higher levels of consultation with Tribes, the State Historic Preservation Office, and communities.

- The American Indian Religious Freedom Act of 1978 protects the rights of American Indians to access and use religious sites, and directs federal agencies to consult with Tribes on ways to ensure this use.

- The Archeological Resources Protection Act of 1979 imposes civil penalties for unauthorized excavation, removal, damage, or defacement of archaeological resources (36 CFR 296).

- Native American Graves Protection and Repatriation Act, passed in 1990, requires an inventory of existing artifact collections, return of human remains, sacred objects, and objects of cultural patrimony to appropriate Tribes. It also calls for consultation with tribes to develop procedures for use in the event that human remains are discovered either by intentional excavation or inadvertent discovery.

Affected Environment

The affected environment includes both known sites, and those that will be located in the decades to come as more of the Forest is surveyed. By the end of September 2000, less than 4% of the Forest (44,058 acres) had been surveyed for archaeological and historical sites and 318 sites documented. Most of these surveys (and site documentations) have been done in order to evaluate the affect of other projects (such as timber or recreation) on heritage resources. In addition, some areas of the Forest have higher site densities (based on their history as mining, tie hacking, or logging districts; topography, vegetation, and/or access to water) and we can make some predictions about the effects of alternatives on these areas and the sites they contain.

Thirty-eight percent (122) of the previously recorded sites date to the era of American Indian settlement that pre-dates European settlement (c. 8,000 B.C. to the mid-1800's). Most of these sites are relatively short-term campsites and/or places where people processed plants, butchered animals, created rock art, or carried out other activities as part of their cycle of life. These sites probably represent upland activities by people who were otherwise based in nearby valleys.

Several of these sites are outstanding for their ability to teach us about the specific role that upland areas played in people's lives. We know that many more American Indian sites exist on the Forest, and will continue to locate and document them. One type of site that we have yet to identify is a traditional cultural property, but we know that they probably exist on the Forest. To date, none have been brought to our attention by local tribes. Their identification and long-term protection depends primarily on consultation with Goshute, Northwestern Shoshone, and Ute traditional practitioners.

Sixty-two percent of the sites documented on the Forest (196 sites) date from the historic European-American settlement era (after the 1840's), and include such sites as mines, tie hacker's camps and dams, logging camps, water control features, livestock grazer's camps, and Forest management facilities. The North Slope of the Uinta Mountains was the scene of intensive railroad tie cutting (or, hacking) and logging from 1869 through the 1940's. Only a small percentage of the cabins, dams, roads, fences and other features created by this effort have been documented (46 sites). The Kamas District also experienced intensive logging in the late 1800's, when numerous mine props, construction lumber, and railroad ties were cut. Only a few of the logging sites from this era have been documented. The Big and Little Cottonwood Canyon area was part of intensive mining from 1870 through the turn of the century, but many of the mines in this area are on patented (privately owned) mining claims. Only 19 mines and quarries have been documented across the Forest generally.

Other important historic sites on the Wasatch-Cache include two small pieces of the Donner-Reed/Mormon Pioneer Trail, the High Lakes Dams above Kamas, various CCC-constructed bridges and campgrounds, and the Temple Quarry area at the mouth of Little Cottonwood Canyon. All of these are significant for their role in the development of local communities. Both Tony Grove Guard Station (in Logan Canyon) and the Howe Flume Historic District (built by tie hackers and loggers on the North Slope) are on the National Register of Historic Places, as well as the Wasatch Mountain Club, which exists under a special use permit at Brighton. Many more European-American sites will be documented in the decades to come. For example, most of the known mining, logging, and tie hacking districts are only partly documented.

Environmental Consequences

Management Activities that Affect the Condition of Heritage Resources

Management actions that can adversely affect heritage sites include anything that might significantly change the important features of a heritage site, and include any kinds of ground disturbing activities, historic building maintenance, and so on. Under all alternatives, there is a potential for management actions to lead to adverse effects to heritage sites. This would be identified on a project-by-project basis, as part of the process of meeting the requirements of Section 106 of the National Historic Preservation Act and National Environmental Policy Act, and would be done under all alternatives, as well. When effects are analyzed as part of project planning, there is also the opportunity to redesign the project to avoid those sites or those adverse effects, or if necessary, mitigate them.

Non-project specific effects (such as illegal use of off-road vehicles, or wildfire) have the greatest potential to adversely affect heritage resources in the long run because they are not as easy to anticipate and/or mitigate. There is also the potential for management decisions to positively affect heritage sites, through such things as interpretation, reduced access to sensitive sites, and general watershed health.

Resource Protection Measures

Applicable laws, policy, and direction provide protection for heritage resources. These require evaluating the effects of projects on heritage resources in partnership with the State Historic Preservation Office and Tribes; resolving any adverse effects; actively locating, documenting, and protecting sites; and producing long-term management plans that will maintain significant sites into the future.

The specific ways in which the laws and regulations can be carried out include a broad range of tools, which cover a wide range of site types and their differing preservation needs, and a wide range of management prescriptions. Traditionally, compliance with Section 106 of the National Historic Preservation Act has been the main way that heritage goals have been accomplished. Other tools for locating and then protecting sites include conducting education programs that encourage site protection by Forest visitors (such as site stewardship programs), and programs that involve Forest visitors directly in research (such as **Passport in Time**). Sites can also be protected through signs that describe proper site visitation etiquette, moving or closing roads or trails that bring too many visitors near sites, stabilizing site features (such as cabins), hardening site surfaces, active law enforcement, site monitoring (to detect sources of damage to sites), etc.

Direct and Indirect Effects

Direct effects to heritage resources include actions that would immediately affect the condition of the site. These actions include outright destruction during a ground-disturbing activity, severe soil erosion, wildfire (for sites that have features susceptible to fire, such as a cabin), transfer of a site out of federal management (as during a land exchange), and so on. Many of these kinds of effects can be avoided through project designs that avoid impacts to the sites themselves. For example, a timber sale can be designed to avoid cutting on or near an archaeological site, or prescribed fire can reduce fuel loading around a site and thus reduce the threat of wildfire. If they cannot be avoided, these direct effects can potentially be mitigated by actions that save as much information as possible about a site (through documentation or excavation), and then make that information available to Forest visitors (through publication of reports, interpretive signs, etc.). Direct effects to some types of heritage sites (such as sacred sites) are very difficult to adequately mitigate, and some Forest users would consider their loss irretrievable.

Indirect effects to heritage resources include a variety of activities that may result from other actions, but later in time. Many of these are the result of easier access to sites (either by road or trail), and/or higher concentrations of recreational activities in a particular area containing sites. A common indirect effect on the Wasatch-Cache National Forest is destruction of site surfaces by off-road vehicles and livestock (and/or wildlife) concentrations. This leads to soil erosion, which includes the soils that also make up archaeological sites, and destruction of site features

(such as building foundations). Soil erosion can also occur after a wildfire, when soils are vulnerable to runoff erosion.

Examples of other indirect effects include burning historic buildings for firewood, collecting weathered wood, and collecting surface artifacts from both ancient American Indian and historic sites. Some of these indirect effects have resulted from management decisions made before the 1970's (when the Forest began implementing the National Historic Preservation Act), when some roads, trails, and livestock features were placed near important archaeological sites. Others are the result of general increases in recreational use on the Forest, or specific recreational activities (such as climbing in areas that also contain archaeological features).

Effects on Heritage Resources from Watershed/Soils Management

Generally speaking, a stable watershed is necessary to the long-term maintenance of archaeological sites, since many of these consist of a soil matrix containing accumulated layers of artifacts and features. Specific projects intended to improve watershed conditions through ground disturbing means (such as planting seeds with heavy equipment or chaining juniper and pinyon) can adversely affect any archaeological sites by damaging the upper layers of the sites (see also the Vegetation Management section below). Past projects have shown that these adverse effects can be avoided through project design (such as seeding areas on or near sites by hand or through aerial distribution).

The best way to maintain or improve soil stability on archaeological sites is through management that maintains or improves the amount of vegetation on those sites (such as following grazing Standards and Guidelines). These benefiting actions would occur less under Alternative 1, and would be most active under Alternatives 2, 3, 6, *and 7*. Sites within the areas of the Forest with more erosive soils are already suffering from erosion, so any management actions that might help stabilize them (without adversely affecting them) are a positive move toward maintaining those sites into the future.

Minerals management that seeks to remove or bury tailings and other mining features that are adversely affecting water quality can adversely affect historic mining sites, since the tailings themselves can be a character-defining feature of the sites. In these cases, adverse effects can be mitigated, but contribute to a general eroding of the historic mining landscape. On the Wasatch-Cache National Forest, tailings piles, concrete foundations, and other features that can adversely affect water quality are also the most visible remains of the mining history that produced them.

Effects on Heritage Resources from Vegetation Management

As with watersheds, a healthy vegetative cover is advantageous to archaeological sites by providing soil stability. Tree roots and trunks can adversely affect structures, but these threats can often be eliminated through removal of a particular tree, if there are no other vegetative issues or concerns. Specific vegetative treatment projects, whether they employ burning, cutting, or seeding, are all analyzed for their effects to heritage resources, and any potential adverse effects can generally be avoided through project design, or if necessary, mitigated. Healthy and diverse vegetation also stands to provide American Indian traditional practitioners with the range

of plants that they need. Alternative 2 has the most vegetation management activities and Alternatives 3, 4, 6, and 7 have about half the vegetation management activities as Alternative 2. Alternative 5 has the least amount of vegetation management activities besides Alternative 1, which has none.

Effects on Heritage Resources from Wildlife and Fish Management

On-the-ground features (such as guzzlers) have the potential to directly or indirectly affect heritage sites, but in most cases, direct impacts can be avoided by placing the features away from sites. Other direct effects can come from vegetation treatment projects (see the Vegetation Management section below). Indirect effects include concentrated herbivore (mainly elk) trampling, which can damage the surface and upper soil layers of sites. Ground squirrel and badger burrowing can also extensively churn subsurface archaeological deposits, but these effects are very difficult to manage.

Many fish management activities take place within active floodplains, which rarely contain significant archaeological sites because of constant sediment movement. One exception is historic bridges, but fish management projects generally avoid these features. Generally, most wildlife and fish projects can be designed to avoid heritage resources, or adverse effects mitigated. This would be done for any new projects under all alternatives.

Effects on Heritage Resources from Recreation Management

Developed recreation has the potential to adversely affect heritage sites through construction of campgrounds, parking areas, and other features. However, these effects can generally be avoided through project design, site interpretation etc. Indirect effects include trampling of sites outside developed recreation sites, but many of these can also be dealt with as part of overall project planning, by anticipating potential indirect effects. All alternatives continue existing developed recreation sites, and allow opportunities to resolve any indirect effects. All alternatives except Alternative 1 allow for some new developed recreation sites, and the affect of any new sites on heritage resources would be analyzed, avoided, or mitigated if necessary.

Undeveloped recreation also has the potential to directly impact heritage sites through construction of trails, hardening of undeveloped camping sites, and other ground disturbing activities. Some direct effects also occur from the use of old roads and trails that happen to run over archaeological sites. Many of these direct effects can be anticipated, and managed through road and trail placement (or mitigated, if necessary). However, undeveloped recreation has more of a potential to create indirect effects to heritage sites. These include such things as modern campers and hunters modifying historic tie camper's cabins to meet their own camping needs, vandalism of rock art, undeveloped camping on archaeological sites, and illegal artifact collection. Illegal off-road vehicle use tends to occur in areas that are open and relatively level; these same areas contain higher concentrations of archaeological sites. As a result, this activity has the potential to adversely affect large numbers of sites. Winter recreation has less potential to adversely affect sites, so varying levels of snowmobile use proposed in the different alternatives do not stand to significantly affect heritage sites. The affects of ski area

management on heritage sites is analyzed each time a new operating permit is issued, and this would continue under all alternatives.
Many indirect effects can be resolved through management actions that monitor sites, restrict certain kinds of activities in caves (such as digging fire pits), and motorized trail designs that encourage users not to stray from them illegally. This could continue under all alternatives, but those alternatives that involve greater amounts of recreation in general, and summer motorized recreation in particular, create more opportunities for both direct and indirect adverse effects to heritage sites. Alternative 4 has the highest potential to affect heritage sites while Alternatives 1 and 2 have the lowest potential.

Effects on Heritage Resources from Roads and Trails Management

There are both direct and indirect effects to heritage resources from the current system of roads and trails. Direct effects include compaction and/or churning of archaeological deposits from old roads and trails that were placed over sites long before the National Historic Preservation Act required that these effects be identified and avoided or mitigated. There are a number of sites on the Forest that have these kinds of native soil roads or trails on top of them. Indirect effects include the ease of access that roads and trails provide to archaeological sites. As with many forms of vandalism, there is a strong correlation between road and trail access and illegal artifact collection.

Another indirect effect to sites comes from illegal use of off-road vehicles away from designated roads and trails. This creates new disturbances on archaeological sites by damaging their surfaces and upper layers. This can also lead to destruction of site features (such as hearths and trash scatters). These illegal roads and trails are far more difficult to manage than the designated road and trail systems. We cannot predict, nor as easily control, all of the places along the system where people might choose to leave the designated travelways and impact archaeological sites. This is already occurring on the North Slope and Stansbury Mountains, where there are sites susceptible to this kind of illegal off-road vehicle use. Alternative 5 could potentially increase the number of trails (including motorized summer trails).

New road construction creates potential direct effects from new ground disturbance through archaeological sites. It can also create the kinds of indirect effects that the existing road system creates. Both kinds of effects from any new roads and trails will be analyzed under all alternatives that allow for these activities, and adverse effects avoided through final placement of the roads or trails, or if necessary, mitigated. Indirect effects are more difficult to manage, but can be reduced through actions such as signage, putting roads/trails in areas with lower numbers of sites that can be accessed directly from the new features, designing roads/trails in such a way that leaving them illegally is more difficult, etc. All alternatives except 1 allow for new road construction, but Alternatives 3, 4 and particularly 5 could increase road construction levels, and thereby increase the need for management of indirect effects.

Effects on Heritage Resources from Wilderness Management

Many of the issues related to recreation in general apply to Wildernesses on the Wasatch-Cache National Forest. Reduced road access means that outright vandalism to sites might be less in the

Wildernesses, but because of fewer other management activities within Wilderness, our knowledge about sites in these areas is limited. Visitor use tends to be concentrated in a few areas (along trails and in clearings), and any sites in these areas could be adversely affected by trampling and illegal artifact collection. Wilderness management encourages minimization of human features, and does not encourage (or in some cases allow) maintenance of historic features. There are few known archaeological sites in the areas proposed for Wilderness. Designation of additional Wilderness, under Alternatives 1, 2, 3, 6 and 7 has the potential to restrict maintenance activities on both known and undocumented sites, to the point of potentially eliminating those sites as interpretive features. This could be mitigated through special language in the legislation that designates potential Wilderness, which acknowledges historic sites as an appropriate part of that Wilderness, or through mitigation of site loss generally through site documentation and other research. This could be particularly beneficial in the Lakes, Stansbury, and High Uintas Inventoried Roadless Areas. Wilderness designations are therefore sometimes a two-edged sword for archaeological and historic sites. They can mean more isolation, and therefore protection, for some sites, but they also mean reduced management options for important sites that would otherwise be maintained as part of the heritage legacy to the future.

Effects on Heritage Resources from Special Areas Management

Several Wild and Scenic Rivers on the Wasatch-Cache National Forest has outstanding heritage values, and these will be protected from adverse direct and indirect effects through design of any trails, parking areas, or other features that might be constructed for use by visitors. Some significant heritage sites exist in the Red Butte Research Natural Area, and because of the high levels of recreation that occur in that area, these sites are experiencing some indirect impacts which can be addressed as part of long-term management of this area. These actions can occur under all Alternatives.

Effects on Heritage Resources from Roadless Area Management

Since heritage sites can be directly affected by road construction, and indirectly affected by the access to them that roads provide, Roadless areas can potentially benefit the overall condition of heritage sites. On the other hand, Roadless protection also means that maintenance, monitoring, and/or other management actions are more expensive to carry out. In addition, trails (particularly motorized trails) lead to the same direct and indirect effects to sites as roads, and these could continue to exist in Roadless areas. The overall level of Forest management activity would be reduced in Roadless areas, and under the current budget structure (wherein heritage surveys are done mainly to provides NEPA input to other projects), this would mean that very few new archaeological sites would be found in these areas. Very little heritage site inventory work has been done in any of the proposed Roadless areas on the Wasatch-Cache.

Roadless management is another arena in which there are both potential positive and negative affects to sites. The positive affect is that the condition of some sites might remain the same with Roadless protection; the negative affect is that few sites would probably continue to be found in these areas, adverse impacts associated with trails could continue, and management

actions (such as site stabilization) which might otherwise benefit the sites would be expensive to carry out. This would occur under Alternatives 1, 2, 6 and 7.

Effects on Heritage Resources from Timber Management

Timber harvesting activities can adversely affect heritage resources through road construction or heavy machinery movement, skidding, tree felling, new or renewed road access into an area (even if only temporary), burning, and/or alteration of the current setting of a site through tree removal. However, under all alternatives most of these adverse effects can be avoided through project design, or if necessary, mitigated. There is still a chance that these adverse effects cannot be avoided, so in general more logging means a potentially greater chance for the loss of heritage sites. As such, Alternatives 1, 2, and 6 provide less of a chance for adverse effects to heritage sites and landscapes than alternatives 3, 4, and 5 through lower levels of timber harvest.

Effects on Heritage Resources from Livestock Grazing

Livestock grazing can produce adverse effects to heritage sites through both direct and indirect means. Construction of troughs, access roads, fences, pipelines, and corrals can directly impact sites, as can weed and other range treatments that disturb the ground. Any new livestock features are inventoried for sites, and the projects re-designed if significant sites are present. Livestock behaviors, such as trailing, congregating, and rubbing against structures can lead to the indirect effects of erosion, altering the distribution of surface artifacts, or outright destruction of features. Some of the Forest's sites that have been most heavily impacted by illegal surface collection occur in areas that are routinely stirred up by livestock (which exposes the artifacts). The same effects can be made by wild herbivores, but these animals tend to concentrate in the same areas as domestic animals (near water sources). Some important Forest sites are near old livestock features (such as troughs built before the 1970's), and are experiencing these kinds of impacts from trampling, etc.

All alternatives allow for livestock grazing, but differ in the degree to which management actions might be taken to remedy any existing livestock impacts to sites. Alternative 1 might see fewer new structures, which would not benefit these sites. Alternatives 2, 4, 6, and 7 would provide some opportunities to resolve resource damage with more livestock structures, while Alternative 3 would more aggressively use structures to restore riparian areas (which is where many of these sites occur). Overall livestock grazing impacts could be greatest under Alternative 5, which would probably lead to increasing indirect effects to heritage sites, and increase the chances of direct effects (which could be mitigated, if necessary). All in all, Alternatives 3, 6, and 7 have the lowest potential adverse affects by livestock grazing on heritage sites.

Effects on Heritage Resources from Minerals and Oil and Gas Management

Mining has the potential to adversely affect archaeological sites, in part due to the fact that many mining claims have the remains of previous mining activities on them. They can also affect sites through construction of roads, machinery housings and other features, and through final site clean up and rehabilitation measures. The use of valid claims would continue under all alternatives, and the affects of any new operating plans would be analyzed and adverse effects, if

any, mitigated. New claims would also be analyzed, although not many of these are anticipated in the next 10 years because of the depressed metals market.

Oil and gas management can also produce adverse effects to heritage resources through road and pad construction, etc., but adverse effects from these kinds of activities can be avoided through project design. Currently, most energy development occurs on the North Slope of the Uinta Mountains in areas that contain an extensive historic logging and tie hacking landscape. Oil and gas exploration has provided more access to specific areas. The Historic Preservation Act will be applied to all lands and are included in the standard lease stipulations. If objects of historical or cultural value are encountered during construction, all work affecting the resource will stop and land management agency will be contacted. Surface-disturbing operations that would destroy or harm these resources are prohibited. These stipulations apply to all alternatives.

Effects on Heritage Resources from Fire Management

Sites that are susceptible to fire include sites with flammable elements (such as cabins) and/or rock features that are subject to rock spalling (such as rock art). The effects of both prescribed and wildland fire on susceptible sites within proposed burn areas will be analyzed as part of fire planning. Any adverse effects from prescribed fire can be avoided through the design of those projects; in wildland fire use situations heritage sites could almost always be protected, but some more risk is present than during prescribed fires. Susceptible sites on the Forest are always in danger of being lost during wildfires, particularly in areas where there is heavy fuel loading. In these cases, there is a reduced chance of being able to protect the sites during fire suppression. As a result, active fire management can benefit many heritage sites in the long run, by reducing the chances of losing sites during wildfires by reducing the chance of wildfire itself. All Alternatives except 4 allow the use of wildland fire, and all Alternatives include fire as an appropriate tool for vegetation management.

Effects on Heritage Resources from Lands Management

Transfer of National Register Eligible heritage resources from federal management is an adverse effect, since those sites would loose their protection under federal law. No state laws in Utah offer protection to sites on private land except the Burial Desecration Law, which only applies to human remains. Covenants protecting transferred sites have been attempted on some Federal land exchanges, with very mixed results. Under all alternatives, each proposed land exchange will be evaluated for its potential to affect sites, and if necessary, adverse effects to sites mitigated before they leave Federal management. Transfer of sites into Federal management is potentially a positive effect, since those sites would then receive protection under federal law. Trespass onto Forest Service system lands can adversely affect heritage sites, if sites are present in the trespass areas, and could constitute an Archaeological Resources Protection Act violation. Any adverse impacts would be mitigated as part of resolution of the trespass case.

Effects on Heritage Resources from Facilities Management

Tony Grove Guard Station is already on the National Register of Historic Places. Twenty other Guard Station complexes on the Forest are potentially eligible for the National Register.

Facilities management that follows the Secretary of the Interior's Standards for Rehabilitation would have a very positive effect on these buildings, and maintain them long into the future. However, facilities management that does not follow the standards, and that makes decisions that would remove these buildings, would create adverse effects. These could be mitigated through site documentation, but since these facilities are such a visible symbol of Forest Service administration, the loss very many buildings could be considered irretrievable by some Forest users. All alternatives provide the opportunity to use the Secretary's Standards, and to continue to maintain the existing facilities, either as Forest administrative sites, or as facilities used in partnership with other organizations.

Cumulative Effects

The potential area of impact for heritage resources is defined both geographically, and culturally, and includes the mountains and adjacent mountain valleys and lowlands for the ten counties of northern Utah and southwestern Wyoming that include National Forest system lands. It includes the mix of upland and valley areas that were used by past peoples to procure all of the resources needed for successful lives.
Adverse cumulative effects to heritage resources on and around the National Forest result from the advances of time (such as weathering), inadequate or inappropriate maintenance, outright destruction, and the steady loss of sites through repeated mitigation of adverse effects that leaves very few of that particular type of site in existence. As a result, the research value of heritage resources can disappear. Sites themselves can become so invisible that they no longer have potential as interpretive sites, and in general cease to be a source of enrichment for present and future generations.

Indirect effects can lead to significant cumulative alterations to individual sites, or all of the sites that represent a particular type of Forest use. For example, illegal surface collection of time-sensitive artifacts from most of the Native American sites on the Forest has compromised our abilities to date many of these sites without expensive excavation techniques. Extensive surface collection, illegal digging, and vandalism can lead to complete destruction of a site.

The Wasatch-Cache National Forest manages a significant portion of the total upland ecosystems that border the Wasatch Front north of Point of the Mountain, to the Idaho border, and the northern and western Uinta Mountains. It also manages large portions of the mountains around Cache, Bear River, Ogden, and Kamas Valleys, and west of Tooele Valley. As a result, the Forest manages the majority of the archaeological and historical record of upland American Indian use, and Euro-american logging, grazing, and water diversion in Northern Utah. One exception is that many mines in the Big and Little Cottonwood area are on private land, where historic preservation laws do not apply. This increases the public value of those mining sites that are on public land.

Many of the upland areas adjacent to National Forest system lands are privately owned, and subject to the steady urbanization that has destroyed many of the archaeological sites that occur in Northern Utah valley bottoms. A significant number of sites in northern Utah generally have been lost to development, and this will continue at an increasing pace. The relatively

undisturbed, and legally protected sites on National Forest land will be of increasing value to our visitors.

Other reasonably foreseeable actions that might affect heritage resources include population growth and increasing numbers of visitors to the Forest. This could create additional direct and indirect effect from recreationists. As the number of visitors increase, so will the agency's need to inform and involve people in Forest management. Forest history itself may provide a useful context for expanding that dialogue. Another foreseeable action will be heritage budgets that may not significantly increase, or instead decrease. This will create a need for further partnerships with local and national organizations and individuals to care for heritage resources. This will be particularly the case with historic Forest Service facilities, such as Guard Stations. Ultimately, as public land management becomes increasingly complex, conflicts over resource values will increase.

The cumulative effect to heritage resources of Alternative 4, which is management under the existing Forest Plan, could potentially be little change. The existing Forest Plan identified a goal of completing a full survey of all areas on the Forest with moderate to high site potential, nominating additional sites on the Forest to the National Register of Historic Places, and completing an overall plan to interpret, protect, and maintain significant sites. Complete survey of National Forests was a common goal in many Forest Plans from this era, and the Agency would continue to lack the resources to complete this massive task. Tony Grove Guard Station has been placed on the National Register, and other sites could continue to be added to the National Register. A Heritage Management Plan has not yet been completed, but despite this, progress has been made in the last two decades in heritage site interpretation and protection. The current Forest Plan also makes specific site preservation and treatment recommendations for some Management Areas, some of which have not been undertaken. These may not now be the highest priorities, since more is known each year about sites in these areas. In addition, the existing plan also does not acknowledge Tribes and local communities as participants in heritage program development.

An overall Heritage Management Strategy (Heritage Objective) would be an important tool for verifying or updating these priorities, developing partnerships with Tribes and other interested parties, and for identifying and achieving even more long-term heritage program goals. It could also help anticipate, and resolve, at least some of the challenges of potential increases in resource conflicts. This Strategy could be implemented under any alternative, but its particular activities would be tailored to reflect overall Forest management priorities. For example, under Alternative 1, little proactive maintenance and long-term protection of sites might occur, and the natural erosion of sites deemed acceptable. On the other hand, Alternatives 2 and 3 would involve more active program support for vegetation treatment and other restoration activities. Alternative 5 might lead to a heritage program whose main emphasis is in dealing with the direct and indirect effects of increased levels of commodity and recreation activities on the Forest. Alternatives 6 *and 7* might create a more balanced heritage program that would also need to potentially address more indirect effects from undeveloped recreation.

The Roadless Area Conservation Rule will apply under Alternatives 1, 2, and 6, and may have a positive effect on the long-term protection of heritage resources because of the link between road

access to sites, and such indirect affects as illegal surface artifact collecting. However, other types of public access to sites, such as motorized trail use, can produce the same types of indirect affects as road access. These can continue with the Roadless Area Conservation Rule. The rule does reduce the possibility of direct effects to heritage sites from road construction, but generally these types of effects can be avoided through project design. As a result, Roadless Area Conservation does provide some additional protection for sites, but does not alone resolve indirect resource impacts possible from the access that motorized and non-motorized trail use produces in Roadless Areas.

In conclusion, Alternative 5 has the greatest chance of creating more direct and indirect adverse effects to heritage sites, through potential increases in road and trail access to sites, greater numbers of ground disturbing activities, and general increase in recreation activities. Alternatives 2, 6, *and 7* would create the least potential adverse effects (both direct and indirect) from ground disturbing activities. Alternative 2 might produce the healthiest vegetation communities, which would benefit American Indian traditional practitioners in their acquisition of plant materials.

None of the alternatives differ substantially for their potential to facilitate active management of sites. On the other hand, it is possible under all alternatives to develop a heritage management strategy that works to minimize adverse effects, and to protect and preserve sites into the future. Perhaps the biggest cumulative effect, either positive or negative, to heritage resources on the Forest will come from how well the heritage resource management strategy is integrated into overall Forest goals, and then implemented. This includes how well adverse effects from specific projects on heritage resources are resolved, to either avoid those sites, or mitigate their loss through products that benefit Forest users. This will be resolved through site-specific decision-making. In this way, positive treatment of heritage resources is possible under all alternatives.

Locatable and Salable Minerals
(Including reference to recreational mining and paleontology)

Introduction

Locatable minerals and salable minerals are natural resources that exist within the Wasatch-Cache NF. Like leasable mineral resources, locatable and salable mineral resources are a finite resource rather than a renewable commodity. They are difficult to inventory, explore, and develop. Interest in these commodities ebbs and flows as economic conditions change.

Locatable minerals (also known as "hard rock" minerals) include gold, silver, lead, zinc, copper, and many other minerals. Salable minerals, which are sometimes referred to as mineral materials or "common variety" minerals, include sand, gravel, stone, clay, and a host of other ordinary minerals.

Laws, Policy and Regulation

- **Mining and Minerals Policy Act of 1970**. This Act states that the continuing policy of the federal government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly and economic development of domestic mineral resources.
- **Energy Security Act of 1980**. This Act directs the Secretary of Agriculture to process applications for leases and permits to explore, drill, and develop resources on National Forest System lands, notwithstanding the current status of any management plan being prepared.
- **36 Code of Federal Regulations, Part 228, Subpart E.** Complete description of the Forest Service's policy on Oil and Gas Resources.
- **36 CFR Part 212, et al. Administration of the Forest Development Transportation System; Prohibitions; Use of Motor Vehicles Off Forest Service Roads; Final Rule, January 12, 2001.** Road management policy to provide a road system that is safe, responsive to public needs, environmentally sound, affordable, and efficient to manage.
- **The Forest Service Roadless Area Conservation Rule (FEIS), November 2000, Volume 1.** Prohibits road construction and reconstruction in inventoried roadless areas within National Forest System lands, unless roads are needed for following: 1) to protect public health and safety, 2) to honor existing valid permits, reserved or outstanding rights or statutes, 3) Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) activities, or 4) to respond to irreparable resource damage.
- **General Mining Law of May 10, 1872.** This law allows prospecting and development of valuable minerals on public lands. This includes locating various types of claims, specifying work required, and patenting under specific circumstances.
- **Organic Administration Act of June 4, 1897,** as amended**.** This Act established the national forests and the specific uses thereof and initial regulation. It extended the right to conduct mining activities under the General Mining Law of 1872 if in compliance with rules

and regulations covering National Forest System lands. The law authorizes the use of National Forest System lands to qualified parties for collection of vertebrate and invertebrate fossil resources.

- **Materials Act of July 31, 1947.** This act gives the Secretary of Agriculture the authority to dispose of mineral materials (common variety minerals) deposits by sale or free use.
- **Multiple Use Mining Act of July 23, 1955**. This Act requires the disposal of common varieties of sand, gravel, stone, and other mineral materials under provisions of the Mineral Materials Act of July 31, 1947.
- **36 Code of Federal Regulations, Part 228, Subpart A.** Describes how locatable mineral activity will be managed on lands open to operations under the General Mining Law of 1872.
- **36 Code of Federal Regulations, Part 228 Subpart C.** Describes how the Forest Service will manage salable minerals.
- **Wilderness Act of September 3, 1964.** This act is subject to valid existing rights; wilderness areas are withdrawn from all forms of appropriation and disposition under the mining and mineral leasing laws.
- **Federal Cave Resource Protection Act of 1988.** Authorizes use and protection of pale ontological resources found in caves on National Forests.
- **Archeological Protection Act of 1979.** Authorizes the use and protection of National Forest lands for paleontological resources associated with archeological resources. Allows collection of rocks, minerals, and fossils for non-commercial use without a permit.
- **36 Code of Federal Regulations Part 251, Subpart B.** Provides direction for managing special uses including paleontological resources.
- **36 Code of Federal Regulations Part 261, Subpart A**. Defines paleontological resources and describes prohibited activities.

The laws authorizing the method of disposal for locatable and salable minerals differ considerably in the degree to which they allow the Forest Service to manage impacts associated with developing either type of mineral. The General Mining Law of 1872, and the Forest Service Organic Administration Act of 1897 that extends application of the mining laws to National Forest System lands, authorize qualified parties to enter lands open to mineral entry and locate mining claims for locatable minerals. Neither Act allows the Forest Service to prohibit mining.

The General Mining law and Forest Service mining regulations establish a process whereby the Forest Service evaluates mining proposals in the context of its responsibilities as steward of National Forest System lands. The Forest Service prepares reasonable mitigation and reclamation measures to address any significant associated surface disturbance. Though reasonable access and occupancy must be granted to conduct mining activities, the scope of these activities will dictate the nature of approved access and occupancy. Access, for example, depends on the stage of exploration or development. It can range from unimproved access by foot through unimproved temporary road access for prospecting or drilling to a more permanent improved road for full-time mine operations.

The Forest ensures that exploration and development of locatable minerals is conducted in an environmentally sound manner and is integrated with planning and management of other natural resources. Where national forest land is not explicitly withdrawn from mineral entry, exploration for locatable minerals under the General Mining Law of 1872 will be permitted under all alternatives. However, site-specific environmental considerations must be addressed when mining activities may cause significant disturbance to surface resources. Additionally, where there may be significant disturbance, the viability of a mineral deposit may have to be assessed before prospecting, exploration, and development would occur.

Salable minerals, which are sometimes referred to as mineral materials or "common variety" minerals, include sand, gravel, stone, clay, and a host of other ordinary minerals.
In contrast to how mining activities must be addressed under the 1872 Mining Law, Congress gave to the Forest Service, through the Secretary of Agriculture, the discretion to dispose of salable minerals by sale or by free use permit. In this context, the Forest Service has complete discretion over whether such disposals are made.

Affected Environment

Locatable Minerals

Historically, locatable minerals have been mined and removed from the Forest in years past. The discovery of silver ore in 1860 led to the settlement of the Town of Alta. Mining activity continued through the late 1800's and early 1900's with the last operation of appreciable size closing in 1967. Most of the activity occurred in mining districts in Little Cottonwood Canyon and Big Cottonwood Canyon. This Forest Plan revision does not affect the quantity or quality of locatable minerals, but it will affect the number of acres where exploration and development are allowed.

In 1985 there were over a 1,000 mining claims on the Forest recorded with the BLM. Since then method by which a claim is maintained has changed and the number has significantly dwindled.

The availability of lands open to operations under the 1872 Mining Law can be affected by several factors including withdrawals, special legislation, and outstanding or reserved mineral rights (National Forest Surface, but state or private minerals rights). Currently there is an estimated 44,500 acres of reserved mineral rights within the proclaimed national forest boundary.

Areas withdrawn from mineral claims include developed recreation sites, administrative sites and wilderness. A total of 329,000 acres are currently withdrawn from mineral entry. Special designations allow mining entry but restrict certain types of mining activity. These include the Salt Lake City municipal watershed Red Butte and Morris Creek Research Natural Areas.

Most of the locatable metaliferous minerals were mined from Big Cottonwood Canyon and Little Cottonwood Canyon on the Salt Lake Ranger District. There are no known locatable mineral deposits of economic value on the forest and there are no known valuable deposits known on patented mining claims that now appear as private land in-holdings on the forest. Presently, there are no significant mining activities on the Forest.

Salable Minerals

Salable minerals are abundant and have been extracted from various locations across the Forest from designated sites or from broad, general areas. Salable minerals are managed at the sole discretion of the Forest Service as far as management and disposal is concerned. The Forest Service is generally the principal user of material from borrow sources on the Wasatch-Cache National Forest. The Forest develops pits for construction and maintenance of forest roads and other facilities. Some salable minerals have been used in the past, and are expected to again be in demand, by oil and gas lessees, primarily on the North Slope of the Uinta Mountains.

Presently, the Forest does have 25 active rock quarries/sand and gravel pits that are in operation. These are used for in-service purposes and provide valuable sources to assist in improving water quality on many Forest roads near stream courses. These pits are scattered across the Forest.

In the next planning cycle it is anticipated that the demand for common variety minerals can be met from off-Forest commercial sources or from private lands within the Forest boundary. Historically, the demand for this mineral has been minimal and it is expected to remain the same.

Recreational Mining

Public interest has increased in casual prospecting for gold using suction dredges and sluice boxes. The public often views this type of activity as “recreational” and it can be authorized under a cooperative recreational permit issued by the State of Utah. When a nominal threshold of disturbance is exceeded, the State permit does not apply and any mining activity is conducted under Forest Service mining regulations at 36 CFR 228 Subpart A. In effect, what the public sees as a “recreational” activity is actually an activity covered by federal mining law and regulation, particularly when impacts become significant. Consequently, “recreational mining” is deemed to be a locatable mineral activity that is managed under federal mining regulations when impacts to surface resources become significant.

Under a cooperative Forest Service/BLM/Utah State permit issued by the State of Utah, Division of Water Rights, there are three stream segments open to recreational dredging, sluicing, and panning. The segments are Three-Mile Creek (Perry Canyon), North Willow Canyon, and Davenport Canyon.

Paleontology

There is essentially no Federal law that mandates the protection of invertebrate fossils but specific federal regulations do cover protection of vertebrate remains. All vertebrate and significant invertebrate fossils can only be removed from National Forest System lands for non-commercial uses with a Special Use Permit. Casual collection of invertebrate and plant fossils does not require a permit. Future inventories may identify individual sites needing specific management direction.

The quality and quantity of paleontological resources that may be present on the Forest is not known. Generally speaking, there are geologic formations containing rocks that may contain

evidence of either invertebrate or, very rarely, vertebrate remains. Rock formations exposed on the forest range in age from Precambrian through Paleozoic and Mesozoic to Cenozoic. They include a variety of rock types but are composed predominantly of sandstone, shale, limestone, and quartzite. Most the Paleozoic age rocks and Mesozoic age formations of marine origin may contain invertebrate fossils that may be of interest to hobbyists. Mesozoic, Tertiary, and Quaternary age strata of continental, lacustrine, or fluvial origin may contain scientifically important vertebrate fossils but extensive inventory would be necessary to identify areas of highest interest needing management direction.

Environmental Consequences

Management Activities That Affect the Condition of the Resource

Any locatable mining activity shall require approval from the Forest Service before any significant ground disturbance occurs. This would include activities at any stage including prospecting, exploration, development, production, or abandonment and reclamation. Also covered, are “recreational mining” activity when impacts associated with that activity exceed the threshold described in the Utah State permit for Recreational Dredging and Sluicing.

It is essential to ensure that all mining activities that may cause significant surface disturbance are in compliance with law (including NEPA), federal regulations, policies, and site-specific requirements as identified in a Plan of Operations. Any approved Plan of Operations that is not administered to standard can affect the environmentally sound extraction of the mineral resource and could result in less recovery that would otherwise be the case.

Existing commercial mineral material sources outside the Forest provide a readily and economical supply to the consumer. Currently, there are no designated public-use sources on the Uinta National Forest. Under all alternatives, it is anticipated that no sources will be identified in the near future.

The distribution of potentially significant paleontological resources on the Forest is unknown. Generally speaking, any activity disturbing the surface could impact that resource.

Resource Protection Measures

Under all alternatives, the General Mining Law of 1872 and Forest Service mining regulations at 36 CFR 228 Subpart A allows prospecting and development of valuable minerals. All regulations require that environmental issues be addressed. The biological standards and guidelines included in the Forest Plan and any legal requirements would apply and be incorporated into a Plan of Operation submitted by the proponents and approved by the Forest Service. This Plan of Operation will cover site-specific environmental issues and be in compliance with NEPA.

In addition, under all alternatives, a surface use determination by a Certified Mineral Examiner may be required to ensure that a proposed mineral exploration or development activity be reasonably necessary and conform to reasonable industry standards. If the mineral examiner

concludes that the proposed activity is not reasonable, it would not be approved under 36 CFR 228, Subpart A.

Where they are identified, the Forest Service manages paleontological resources for their scientific, educational, and recreational values. Existing law and regulations provide different direction on managing all vertebrate and some invertebrate fossils. Qualified parties can obtain a Special Use Permit, to include proper resource protection provisions, to collect vertebrate and significant invertebrate fossils for non-commercial purposes. No permit is needed for casual collecting of invertebrate and plant fossils for personal use.

General Effects

Presently, there are no significant mining activities on the Forest. There is a scattering of mining claims recorded with BLM across the Forest. Most are along the Wasatch Front and on the Kamas District. Beyond casual prospecting, there is no significant level of activity on any of the claims. It is anticipated that locatable mineral activities will not increase above present levels on the Forest for the foreseeable future.

The alternatives may affect the quantity of locatable minerals available for development and they will affect the number of acres where mineral exploration and development is eventually allowed. Until such time as the selected alternative is identified and any lands included in that alternative are segregated from mineral entry, all lands will remain open to operations under the General Mining Law of 1872. The management prescriptions identified in Table LO-1 show the possible eventual result of prohibitions on mining on withdrawn lands.

Areas presently withdrawn from mineral entry include all of the designated wilderness areas on the Forest as well as developed recreation sites and administrative sites. Reasons for recommending that additional lands are withdrawn from mineral entry could include laws, legislative direction, agency policies, capital investments, long-term permits, administrative use to conduct day-to-day Forest duties, and potential for adverse displacement of permit tees and recreationists. In addition, withdrawals may be recommended due to environmental and site-specific issues such as geological features (e.g., caves and landslides), municipal watersheds, and animal and plant species as per laws, biological opinions, and conservation agreements. Table LO-1 shows those National Forest System lands by management prescriptions under each alternative that would be withdrawn from locatable mineral entry and disposal of salable minerals.

Table LO-1. Acres Proposed for Withdrawal from Mineral Entry

Management Prescription	Acres by Alternative						
	1	2	3	4	5	6	7
Recommended Wilderness (1.5)	387,000	145,500	51,100	0	0	69,000	73,300
Research Natural Areas (2.4)	5,600	5,600	4,500	6,100	5,300	5,600	5,600
TOTAL ACRES	**392,600**	**151,100**	**55,600**	**6,100**	**5,300**	**74,600**	**78,900**

Over the next decade, it is anticipated that the demand for salable minerals can be met from commercial sources on private lands. Historically, the demand for these minerals has been minimal on National Forest System lands and it should remain the same. Disposal of this resource is by sale contract or free use permit at the discretion of the Forest Service.

Direct and Indirect Effects

Locatable mining activities could have significant adverse impacts on other resources, depending on the scope of the activity. Some impacts could be unavoidable while others may be mitigated. The analysis of the level of impacts and possible mitigation measures would be presented in a site-specific environmental analysis prepared before any Plan of Operations were approved. Reasonable mitigation and reclamation measures would have to be incorporated into the final approved Plan of Operations. Administering the plan to standard would ensure that impacts to other resources are within the scope of those described in the environmental analysis. The operator is also responsible to ensure that mining operations are in conformance with standards established in the Plan of Operations.

As new technology develops, more opportunities to extract locatable minerals from the Forest may occur; however, economics and environmental issues may create limitations such that technology may not be able to overcome such constraints.

Effects on Locatable and Salable Minerals from Riparian Habitat Conservation Area (RHCA) Management

The management of these resource areas would have impacts on mining activities, such as constraints on road construction and reconstruction. RHCAs include limits on mining activities such as no embankments and/or tailing dumps within any water/riparian areas.

Any salable mineral proposal that would have adverse effects on aquatics would be prohibited because the opportunities for mitigation measures are anticipated to be limited in scope. Any proposed locatable mineral activity would be evaluated through a site-specific analysis whereby alternatives are evaluated to address the range of possible impacts.

Other constraints would apply to fueling locations, access roads (minimal in locations and numbers), waterway crossings, cleaning of equipment, timing restrictions, issues of sedimentation transport and related abatement measures, potential degradation of affects to aquatic organisms, and passage for and impacts on species-at risk. The potential locatable mineral operation impacts to RHCAs may be significant if measures are not in place to protect aquatic habitat. It is essential that if a mining activity is permitted, the Plan of Operation addresses biological issues, and any mitigation measures are in place.

Effects on Locatable and Salable Minerals from Inventoried Roadless Area Management

The Roadless Area Conservation Rule (RACR) would restrict road construction and reconstruction in roadless areas in Alternatives 1, 2, and 6 and in over 95% of roadless areas in Alternative 7. However, under the General Mining Law of 1872, reasonable access must be provided, and access standards must be commensurate with the proposed activity. All proposals for locatable mineral exploration or development would be subject to 36 CFR 228, Subpart A. Significant ground disturbance to National Forest System lands would require site-specific NEPA analysis and a detailed Plan of Operation would be developed. Access rights will be recognized to those claims but the standard of access across National Forest System lands will be commensurate with the level of activity proposed on those claims.

Under all alternatives, the Forest would be open to locatable mineral development, except for those areas withdrawn from mineral entry. Additional areas, identified by alternative in Table LO-1, could be eventually withdrawn from mineral entry. However, it is anticipated that for all alternatives over the next decade very few new mining claims would be located due to low commodity prices, higher environmental and permitting costs, and apparent lack of public support for exploration and development on public lands.

In Alternatives 1, 2 and 6 exploration and development for salable minerals within inventoried roadless areas will be limited due to the prohibition of road construction and reconstruction except for outstanding rights. In all other alternatives while some development is allowed in inventoried roadless areas, development of sources would be incidental to new road construction or reconstruction activities.

Effects on Locatable and Salable Minerals from Noxious Weed Management

Management of noxious weeds may have a small impact on locatable and salable mineral development. Similar to the requirements applicable to RHCAs, equipment would require inspection and cleaning before entering and movement within the Forest. These requirements would assist in the isolation, eradication, and control of invasive non-native plant species. The requirements of certified weed-free hay, straw, and seed in rehabilitation of disturbed sites are essential to ensure that noxious weed propagation is abated. Additionally, the importation of topsoil would be prohibited due to the potential of importing noxious weeds and seeds. The effects of a noxious weed program on mining activities would be increases in costs for abatement and monitoring to ensure that the proliferation is limited.

Effects on Locatable and Salable Minerals from Fish and Wildlife Management

Effects on Threatened, Endangered, and Sensitive (TES) fish, wildlife and plant species, including bats and raptors such as goshawk, would require restrictions and mitigation measures for protection. Complete avoidance of sensitive plant habitat would be required and identified in a Plan of Operation. Fisheries habitat for Colorado River and Bonneville cutthroat trout and other fish will require some limitations and be site-specific. Winter range timing limitations would apply where appropriate.

Effects on Locatable and Salable Minerals from Managing Other Resources

Effects of managing other resources such as watershed, water quality, and air quality would require compliance with the standards and guidelines for managing these resources found in the Forest Plan. Impacts would depend on the complexity of the proposed project and its location. Site-specific issues and mitigation, if any, would have to be addressed in a Plan of Operation, which would be binding on the proponent/operator.

Managing other resources such as recreation and grazing would also require the impacts of locatable and salable minerals activities to be implemented in an orderly manner. Fire management, heritage resources, and scenery management will require compliance of laws and agency policies for any mineral activities. Restoration and mitigation measures of mineral activities would be required to ensure that these resource activities continue as identified in their respective management prescription objectives. Locatable and salable mineral activities would generally not be allowed in Research Natural Areas, thus the reason for these areas to be withdrawn as identified Table LO-1.

Management prescriptions 2.6 and 3.1 and RHCAs would not be recommended for withdrawal, but would require specific mitigation measures to ensure laws, policies, and aesthetic values would be met. The revised Forest Plan contains standards and guidelines that outline specific direction on resource values pertaining to these (and other) prescriptions. Decisions to withdraw additional National Forest System lands as shown in Table LO-1 would preclude prospecting, exploration, and developing any potential locatable minerals. This would displace mining activities elsewhere on the Forest or onto non-forest lands.

Cumulative Effects

Mineral and energy resources in Utah support a viable industry. Although alternatives 1, 2, 3, 6, and 7 would eliminate mineral development in areas newly recommended for wilderness designation, most of the Forest would remain open to mineral development. Whether any minerals are present and the economics of exploration and extraction will govern any decision by the public to actually explore for and develop minerals on the Forest.

The one impact that could affect the Forest would be honoring existing rights to access private mining property, such as that in Big Cottonwood Canyon and Little Cottonwood Canyon.

Access into and out of these areas is limited and not readily available without significant costs associated with the reconstructing of several Forest roads.

No significant cumulative effects are anticipated with salable mineral materials or with paleontological resources.

Social and Economic Analysis

Introduction

This section contains information on the legal and administrative framework within which decisions must be made, a section on the affected social and economic environment to set context, an analyses of economic impacts by alternative, a financial efficiency analysis (present net value (PNV), distribution analysis (includes effects on employment and labor income for two modeled areas), social impact analysis, and a discussion and estimate of cumulative effects.

Laws, Policy, and Direction

- The **Multiple-Use Sustained-Yield Act of 1960** identifies guiding principles for managing the resources of the National Forest System. The direction to manage these resources for the greatest good over time necessitates the use of economic and social analysis in determining management of the National Forest System.

- The **National Environmental Policy Act of 1969** requires that before any agency of the federal government may take actions significantly affecting the quality of the human environment, that agency must examine not only the potential impacts of that action on physical and biological resources, but also the socioeconomic consequences (40 CFR 1508.14).

- The **Forest and Rangeland Renewable Resources Planning Act of 1974**, as amended by the **National Forest Management Act of 1976**, establishes the requirement to consider economic effects in the land management planning process.

- **Title 36 Code of Federal Regulations Part 219** implements sections 6 and 15 of the National Forest Management Act. It provides guidelines for evaluating alternatives in forest plans and requires consideration of economic and social factors.

- **Office of Management and Budget Circular A-94** (revised March 27, 1972) provides guidelines for evaluating the economic efficiency of federal agency programs and projects.

- **Office of Management and Budget Circular A-116** (issued August 16, 1978) requires executive branch agencies to conduct urban and community impact analyses of major initiatives and to conduct long-range planning.

- The **Public Rangelands Improvement Act of 1978** requires economic analysis of grazing use on Forest Service administered lands, fee formulas, and funding of rangeland programs and identification of associated economic impacts on the livestock industry.

- **Executive Order No. 12898 on Environmental Justice** (issued February 11, 1994) requires that each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

Affected Environment

Regional Overview

Over the last 25 years the economy of the Intermountain West has become more diversified, more urban or suburban, and less dependent on agriculture and resource extractive industries on national forest lands (timber harvest, livestock grazing, oil and gas production, and mining). In general, the economy of the area surrounding the Wasatch-Cache has prospered and grown substantially over the last generation, and especially during the 1990's. This growth mirrors, but also has surpassed some national economic measures of growth. The Utah Governor's Office of Planning and Budget and the State of Wyoming's Division of Economic Analysis both have abundant statistics for the last several years that show substantial statewide and county growth.

In 1999, the economy in Utah showed continued expansion, recently however, the rate of expansion has slowed (Isaacson, July-August, 2000). At the beginning of the year 2001, there were growing concerns about a downturn in national economic trends. The stock market in 2000 had its first down year in nearly a decade, and some measures of overall economic activity show a slowing of the economy during the latter half of the year (BEA, 2001). The Federal Reserve Board, after earlier concerns for inflation in 2000, recently cut interest rates to stimulate flagging conditions and avoid recession (February, 2001), and the new Bush administration implemented a tax cut, in part to revive the economy. Over the past two decades the intermountain west has fared comparatively well when compared to other regions of the country. Nevertheless, while many observers suggest recent sluggishness is only a short-term correction in an otherwise expanding economy, others have more concern about the future.

The importance and extent of social and economic impacts vary based on the perspective of the individual. On one extreme, there are those who would make social and economic needs of the local community, or an even smaller segment of society, of paramount importance above all else. Others would advocate that social and economic factors are of no importance and should be completely disregarded in favor of environmental concerns. The challenge for the Forest Service is to find an acceptable balance between resource use and preservation. Even then, there will be those who will resist acceptance of a final decision.

Study Area

In describing the social and economic environment that may be affected by the Wasatch-Cache Forest Plan, each county is described in terms of lifestyle and quality of life as

well as the level of interest and issues highlighted in Forest Plan revision processes. Following these general descriptions of the individual counties within the study area, a general review of the regional social and economic environment at the county level will provide a basis for context and comparisons.

The counties included in the analysis, Box Elder, Cache, Davis, Morgan, Rich, Salt Lake, Summit, Tooele, Weber, and Uinta, will be referred to collectively as the regional study area. Wasatch and Duchesne counties have not been included in the analysis, the acreage of Wasatch-Cache National Forest within these county boundaries are small, 21,173 and 29,709 acres respectively, and the culture and lifestyle of the counties are associated with the Uinta National Forest. For more information on these counties and their relationship to forest planning, refer to the Wasatch-Cache National Forest Plan documentation.

The following descriptions of counties in the study area are presented to provide social and economic context for this analysis. Information presented is largely from interviews with county planners, but also comes from impressions gathered during scoping, and other published sources (See Appendix B11 and project records for more details.)

Box Elder County

The lifestyle in Box Elder County is small town or rural. Urban expansion and development influences from the Wasatch Front (Salt Lake and Ogden) are beginning to reach Brigham City. Lower land values in the area and more available open space may see more urbanization of the area over the next two decades. The Standard Examiner recently covered stories in which concerns for rural and agricultural preservation were expressed which opposed suburban development proposals.

Generally, there have been few Forest Service activities proposed in Box Elder County on the Wasatch-Cache. The Wellsville Mountains are mostly designated Wilderness, and the Willard Peak and Ben Lomond areas are steep, rocky and unsuited for most development activities. Traditionally, these areas have been used for watershed and backcountry recreation. Box Elder County has recently been interested in interacting with the Forest Service on trails and roads management, especially as it affects wildland resource values. During Forest Plan scoping, Honeyville community leaders expressed the need to maintain quality watershed for the town.

Cache County

This once rural agricultural county now has significantly more national chain restaurant and store franchises, shopping centers, and other suburban amenities than it had 20 years ago. There is substantial new light manufacturing in the county, a bigger hospital has been built, county buildings are proposed for improvements, and other growth related symptoms are apparent. Traffic in the Logan areas is noticeably more congested than it was a few years ago. The recent improvement of U.S. 89 from Brigham City and future improvements to the Logan Canyon Highway provide speedier and safer access to other areas for commercial and personal uses. While development pressures continue, most

people in the county appreciate the high quality of life that they have, and ready access to wildland recreation is a very important component of the lifestyle.

Several forest plan-related public meetings that were held in the Logan area had the largest attendance of any area where these meeting were held. Interest in the proposed action and alternative development was broad, and interactions with the Forest Service and between community members has been considerable and vocal. A broad range of opinions regarding future Wilderness proposals, Wild and Scenic River proposals, motorized and non-motorized access opportunities, snowmobile use, management of roadless areas, and livestock grazing have been voiced.

Davis County

Most of the people in Davis County have a suburban lifestyle. Those who live next to the forest often enjoy hiking directly out of their neighborhoods onto the public lands, where they use planned and developed trails. Sometimes the foothill vegetation and watershed are impacted by inappropriate use of ATVs, creation of haphazard trails, or trash dumping. These activities are not allowed, but are often difficult to enforce even though Davis County and the Forest Service have posted the area. Most of the water from small streams that run off the Forest is used to supply culinary water to towns in Davis County.

While no public meetings were held in Davis County during scoping, for the Preliminary AMS and Proposed Action, a number of respondents commented on these two documents from a variety of perspectives. Davis County has indicated that while watershed is a critical concern for communities at the base, maintaining and improving outdoor recreation access and fire protection in the foothills are also increasingly important management needs.

Morgan County

People in the Morgan County still live in small towns or in the countryside on small acreage non-commercial home sites. Some agriculture is practiced, but it is an important economic activity for only a few residents, as most commute to jobs on the Wasatch Front. Only a small section on the western edge of Morgan County is within the Wasatch-Cache National Forest. This part of the Forest is steep and undeveloped. Access to this portion of the Forest is very poor or non-existent, yet this main ridge of the Wasatch Front provides critical watershed for the county, and backcountry recreation activities for people who mainly access it from the Salt Lake and Davis County areas.

The majority of people attending forest plan meetings held in the Ogden area in 1999 were from Morgan County. Some of these users expressed an interest in maintaining traditional motorized (winter and summer) recreation access on the Forest. In a Forest Plan scoping meeting held in Morgan County in the spring of 1999, concerns for potential deterioration of watershed conditions by possible development above Mountain Green were expressed. County planning and zoning personnel noted that sustainability of

national forest watershed, and water supply and water quality issues were among the more important that were facing the county.

Maintaining a rural or small town atmosphere for the county is an important value held by many residents. Transportation planning to meet the needs of an increasing population was also an important issue.

Rich County

Rich County has a rural, agricultural lifestyle, much of which relates to public lands uses. More traditional values regarding land use on public lands are commonly held. Many people still make their living in agriculture (mostly livestock grazing), and work closely with the land on a daily basis. Hunting, fishing, riding and other rural and outdoor recreation activities are common. For most shopping and dining, or social opportunities, people go to Evanston, Ogden, or Logan. Raspberry farming is still carried on in the Bear Lake area, but production is not as large as it was 20-30 years ago. The economy of the Bear Lake area is more active in the summer with increased seasonal recreation. Often young people must leave the county after high school or college graduation to find desirable employment.

One public meeting regarding forest plan revision was held in Randolph. The turnout for the meeting at the courthouse was small, therefore not a large number of local opinions have been heard on forest plan issues and decisions. However, there have been other recent projects and grazing permit related work done in the county offering public opinion on general Forest issues. The county planner and commissioners have been consulted regarding the forest plan revision. The desire to continue existing land use opportunities has been stressed in these interactions.

Salt Lake County

Salt Lake County is the largest urban center in the Intermountain Region, and functions as the transportation, cultural, political, and economic center. Its citizens, Salt Lake County and local governments recognize the vital role National Forest lands and the canyons east of Salt Lake Valley play in adding to the quality of life for the area. The proximity of cooler high elevation forested lands, internationally renowned ski areas, developed camping and undeveloped recreation opportunities, three designated Wildernesses, and a spectacular scenic backdrop are not taken for granted by residents. Employers often use outdoor recreation proximity as a lure to attract new residents to the area.

The Forest Service, county and city officials recognize that as costs of government escalate, it is mutually beneficial to share expertise and resources for public benefit. One example is the cooperation between Salt Lake County and the Forest Service over the past decade to improve stream habitat, riparian environment and recreation facilities in Mill Creek Canyon. It is expected that similar cooperative projects will follow in this county and across the Forest.

Several public meetings have been held in the Salt Lake area on forest plan revision and they have been well attended. A broad spectrum of public opinions was represented. Over the past several years, interest in local Forest Service activities has centered on ski area expansion proposals, helicopter skiing, undeveloped and developed recreation and Wilderness management issues. Watershed protection and water quality have also been ongoing concerns.

Summit County

People whose families have lived in Summit County for several generations, as well as the many new arrivals to the area are both enamored with Summit County. The area's rural and small town lifestyles, year-round outdoor recreation opportunities, good schools, and prosperous economy make it a great place to live and raise a family. Most citizens of the area have benefited from its recent economic prosperity and their proximity to a major urban area for services beyond what the local area provides.

Summit County government has expressed an interest in close involvement with the Forest Service as the forest plan is revised. The county is interested in the economic and social effects of national forest management as it relates to its citizens, and want to emphasize cooperative planning to help reach a desirable future. KPCW, a public radio station in Park City, often airs programs highlighting national forest issues, helping to involve and inform the community.

Public meetings held in the Kamas City Hall over the past year on the forest plan topics have added to the Forest Service's understanding of public sentiment. Individual citizens have commented during Forest Plan scoping and proposed actions from a broad range of perspectives.

Tooele County

Many people have found that living in Tooele County and commuting to work in Salt Lake County or Utah County, is a very reasonable alternative to living directly on the Wasatch Front. In Tooele County, home and real estate prices tend to be lower for similar homes to those in Salt Lake, and commuting time and costs are not much different. The smaller town and/or rural lifestyle possible in the county is also attractive to those who have chosen to live in the area. While the county generally serves as a bedroom community for those who commute to the Wasatch Front, many do work locally. These people are employed in the local support service and retail work mentioned above, as well as at Tooele Army Depot and Dugway. The County is actively seeking other industrial and commercial development, so that the area can be more stand-alone in respect to its economy, employment and tax base.

Tooele County planners and elected officials have expressed interest in forest planning and its potential for land allocations since the planning process began more than a year ago. The County is interested in engaging with the Forest Service in watershed protection and development projects (and has in the recent past – Clover Creek), and in

coordinating and ensuring trail use opportunities for its citizens across county, private and federal lands. Letters from interested citizens have indicated similar interests. One public meeting held in Tooele at the release of the Preliminary AMS was lightly attended.

Weber County

In general, local people make up the majority of national forest users east of Ogden. Hiking on trails on the east bench and up canyons out of Ogden is a popular pursuit, as is boating at Pineview Reservoir, fall hunting, and the use of developed campsites. Snowmobiling in the Monte Cristo area and skiing at Snowbasin are popular winter activities. Ogden and Weber County residents are supplied by water from captured stream runoff from the mountains, artesian wells, Pineview Reservoir (also a major Forest Service recreation use area) and the Weber River basin.

Recent results from the 2000 census show that the Hispanic population of Ogden City has grown to 24% of the population. (Buchta, March 22, 2001). This is approximately a doubling of Hispanic people in Ogden over the last ten years. Other urban complexes along the Wasatch are also experiencing this trend, but in somewhat lesser percentages. These potential new users of the Wasatch-Cache perhaps bring with them somewhat different use patterns and interests as they related to the Forest.

Public meetings and work sessions on the Preliminary AMS and Proposed Action were held in Ogden at Weber County Library branches (Huntsville and Ogden) and at Ogden High School. These meetings received a moderate attendance of users with a variety of viewpoints regarding the issues that were presented. Interest in the land exchange process and development of Snowbasin over the past decade has been major. There is a continual interest and community participation in trail development project on the front and in Pineview Reservoir recreation issues.

Uinta County, Wyoming

People with long-term ties, as well as newcomers to the area value the rural lifestyle and environment that Uinta County provides. The idea of creating conservation easements as is occurring in other parts of the West is actively talked about. Access to public lands is an important value. Most people work locally, but a growing number commute to Salt Lake City or Park City for jobs, as access is relatively quick down I-80. Some airline employees and pilots who work out of the Salt Lake International Airport commute from Evanston. Lower income and sales taxes in Wyoming, lifestyle preferences, and somewhat lower property prices also provide an incentive for some to live here. The City of Evanston has a diverse and well-developed public recreation and parks program. In addition, the population can enjoy outdoor activities on public lands including; hunting, fishing, horse use, camping, hiking, cross-country skiing, use of ATVs and snowmobiles. Many have significant investments in time and/or dollars in these recreation interests. There is increasing public demand for year-round access to the Forest. The growth of winter recreation activities (snowmobile and skiing use) translates to higher winter management costs for the Forest Service than in the past.

Uinta County requested cooperating agency status from the Forest Service for the purposes of forest planning, and has been given that status. Local ranching, timber harvest, oil and gas, and recreation users are very interested in long term planning and project activities on the Wasatch-Cache. Many long-term residents are concerned that possible changes to general multiple-use opportunities will deleteriously affect desirable traditional lifestyles and the local economy. It is a strongly held belief among these people that there are trends towards restriction of ongoing land-uses. It is thought that this trend has been apparent over the last 20 years, and the trend is undesirable and threatens their interests.

American Indians

American Indian people have occupied areas in northern Utah and southwestern Wyoming for thousands of years. Archeological evidence and historical and ethnographic accounts attest to the diversity, longevity, and importance that American Indian groups have had in this area. Descendants of these historic groups occupy areas of northern Utah, southeast Idaho, and Wyoming.

American Indians today retain inherent rights based on provisions of the United States Constitution and treaties with the United States that obligate the United States to maintain government-to-government relationships with federally recognized tribes. Numerous laws, forest planning regulations (36 CFR 219.7) and Forest Service policy (Forest Service Manual 1563) all speak to the recognition of American Indian governments and require consultation with tribes regarding decisions that have the potential to effect treaty and traditional and cultural values. In general, these laws and policies recognize tribal sovereignty, and treaty rights where they exist, and support traditional economic, cultural, and religious practices.

The Wasatch-Cache National Forest is very interested in cultivating good relationships with American Indian groups. National Forest lands and resources represent significant cultural and economic values to American Indians and to the other citizens of the United States. Several land management issues and concerns are of mutual interest to tribes and the Forest Service.

In Utah, Forest Supervisors have the responsibility for implementing government-to-government communications and coordination with federally recognized tribes. District Rangers also interact with Tribes on day-to-day matters, under the authority of the Forest Supervisor. In the past year the Forest Supervisor, Deputy Forest Supervisor, and District Rangers have met directly with tribal leaders to develop understanding of their interests or concerns regarding national forest lands.

Three American Indian tribes are closely related to land areas of the Wasatch-Cache National Forest. These are the Skull Valley Band of Goshute Indians, the Northwestern Band of Shoshoni, and the Northern Ute. While these tribe's reservations are within areas where they lived historically, Shoshonean and Ute groups used to range freely over much larger areas covering millions of acres of land that is now in federal, state, local,

and private ownership. As sovereign governments, American Indians have status equal to or above that of state and county governments. Because of the unique trust relationship between the federal government and tribes, Indian Nations and tribal members are distinguished as different from the general public. Treaties, statutes and executive orders often reserve off-reservation rights and address traditional interests relative to the use of federal lands. Maps estimating the extent of the tribes' historic use areas are on file at the Forest.

Skull Valley Band of Goshute Indians

The Skull Valley reservation is adjacent to the Wasatch-Cache National Forest along the southwest slopes of the Stansbury Range. Their reservation occupies over 17,000 acres and the Skull Valley Band maintains an office in Salt Lake City. The reservation population is about 25, while total tribal enrollment is over 100, with most members living off the reservation (USDA Forest Service 2000k).

The Treaty of Tooele Valley was signed on October 12, 1863. No land was set aside as a reservation until 1912. The band does not have a constitution or charter, but is governed by a tribal council and executive committee.

Discussions between the Wasatch-Cache (the Forest Supervisors and Salt Lake District Ranger) and the Skull Valley Band indicate that the American Indians are interested in the protection of cultural sites and human remains, Wilderness protection and designation, problems with public or agency access across the reservation to the national forest, and developing more economic opportunities for tribal members.

Northwestern Band of Shoshoni

The Northwestern Band of Shoshoni reservation occupies 187 acres of land in northern Box Elder County, and the tribe maintains an office in Brigham City, Utah. In 1996 there were 383 enrolled members in Idaho and Utah who maintained residences over a large area reservation (USDA-Forest Service 2000k).

The Treaty of Box Elder of 1865 was the first signed by members of this band. Subsequent treaties and ratification dates related to the Northwestern Band of Shoshoni are 1872, 1874, 1880, 1881, 1882, and 1889. A constitution for the tribe was approved in 1987.

The Forest Supervisor and Logan District Ranger have interacted with the Northwestern Band of Shoshoni during 2000. Discussions with the Northwestern Band of Shoshoni indicate that they are interested in protection of American Indian sites on the Forest, Wilderness designation, acquisition of more sovereign lands for their reservation (not specifically related to national forest lands), and continuance of cultural integrity and traditions.

Northern Ute

The Uinta and Ouray Indian Reservation (of the Northern Ute Tribe) is large, occupying about 4,500,000 acres in eastern Utah within Uintah, Duchesne, Grand and Wasatch Counties. A tribal office is maintained at Ft. Duchesne, Utah (See the Northern Ute Webpage at www.ubtahnet.com). The Northern Utes are governed by six council members, two each from the three bands that make up the tribe: Uncompahgre, Uintah, and Whiteriver. Tribal enrollment is over 3,000.

Primary working relations with the Forest Service are maintained through Ashley and Uinta National Forest leadership, rather than by the Wasatch-Cache. This arrangement is practical, as the reservation is contiguous with those two Forests and at some greater distance from the Wasatch-Cache. The Wasatch-Cache recognizes that traditional and historical tribal interests also extend onto lands managed by it, but that most Forest Service interactions with the tribe are better served by dealing with the other two Forest offices.

The Northern Utes are interested in numerous issues related to the national forests in the area, including maintaining access to traditional gathering sites and ceremonial areas, maintenance of cultural lifeways, issues relating to access and roads, passage of recreationists across tribal lands to national forest lands, and water rights (H. Jay Groves, Northern Ute Tribe, personal communication, 11/15/2000.)

Land Ownership

The Wasatch-Cache administers National Forest System lands in all counties within the regional study area. The acreages of National Forest System lands and total county acres are displayed in Table SE-1. The amount of National Forest System lands in each county varies significantly. Other federal lands (lands managed by the Department of Defense, the BLM, Caribou, Sawtooth, Ashley, and Uinta National Forests) also make up substantial portions of Box Elder, Tooele, Rich, and Uinta counties.

Table SE-1. Area figures for counties within the regional study area

County	County total land base**	National Forest lands*	Wasatch-Cache Forest lands
	- - - - - - - area in acres- - - - - - - --		percent of total
Box Elder, UT	3,592,960	24,328	<0.1
Cache, UT	749,440	267,827	35.7
Davis, UT	171,520	37,580	21.9
Morgan, UT	385,920	13,996	3.6
Rich, UT	661,760	49,398	7.5
Salt Lake, UT	488,960	95,533	19.5
Summit, UT	1,183,360	501,871	42.4
Tooele, UT	4,430,720	150,234	3.4
Uinta, WY	1,336,417	37,762	2.8
Weber, UT	412,160	67,805	16.5

Sources: Land Areas of the National Forest System, 1998. www.dced.state.ut.us/history/history facts/uhcounty statistics.com.

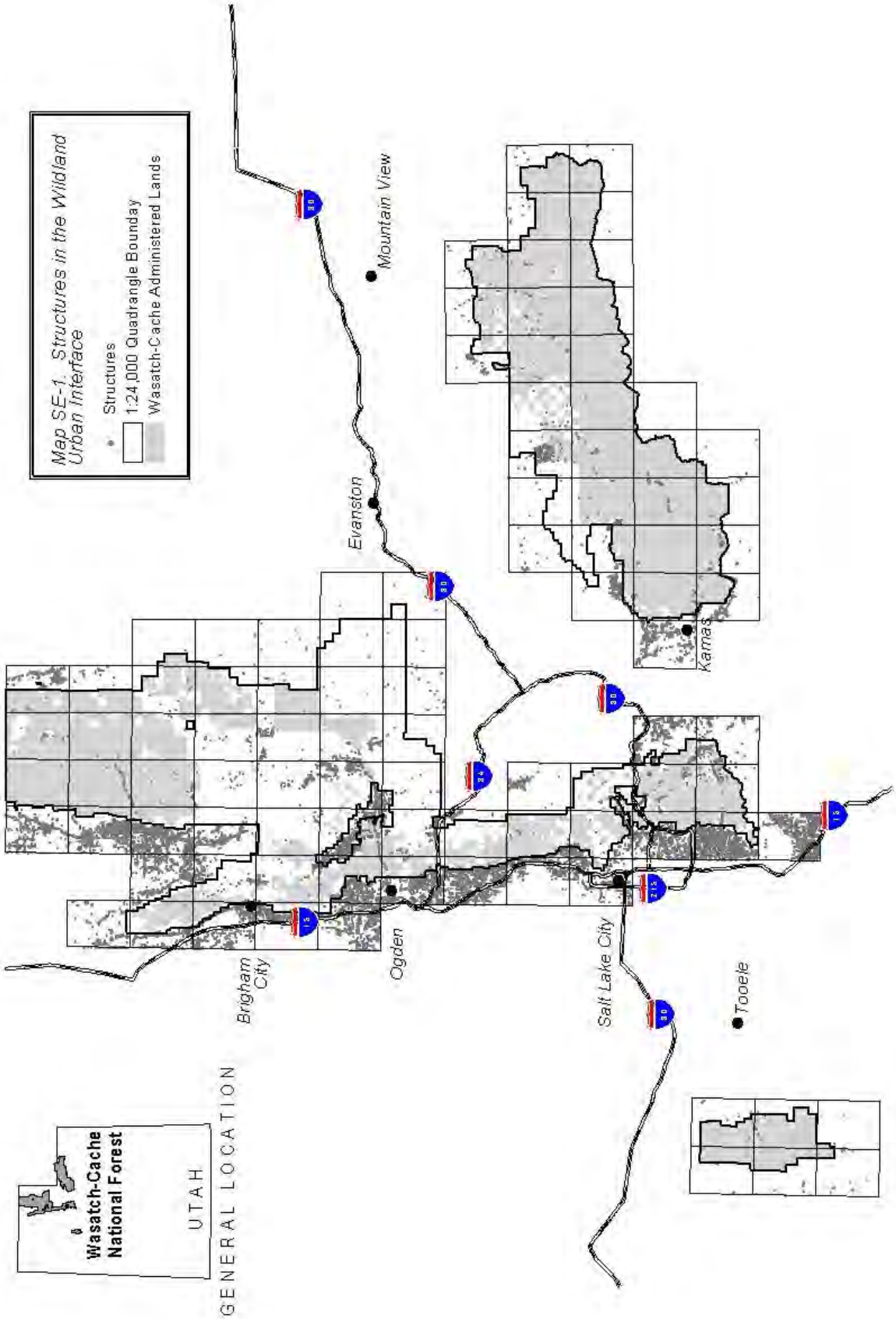
Demographics

The population in the area of the Wasatch-Cache's direct influence is growing at a rapid rate. Overall in the State of Utah, the population has grown from 1,729,100 in 1990, to about 2,172,513 in 2000, and is projected to reach over 2.7 million by 2010 (Utah, State of 1998). Most of the growth has been and is projected to be in areas surrounding the Wasatch-Cache National Forest. The majority of this population increase is due to births in the state, however, a substantial percentage is also due to recent increases in immigration.

The State of Utah and local associations of governments (Mountainland AOG, Bear River AOG, and Wasatch Front Regional Council), counties, and cities all recognize the major changes that population increases have had and will continue to have on life in northern Utah. Planning efforts within and between all these entities consider population growth related questions among the most important that need answers. Similarly, the Forest Service in northern Utah has seen user demand continue to rise mostly as a simple response to the growing number of people in the area.

On the eastside of the Wasatch Range (Heber Valley, Summit County, Morgan County, Ogden Valley, and Cache Valley) growth rates and development are faster than on the more populous front. More detailed discussions of each county are developed below. County planners (Summit, Uinta, Tooele, Weber, Cache) recognize that there is a trend toward transition of rural agricultural landscapes to suburban or urban development, and some county zoning direction is beginning to protect and preserve rural areas. National Forest System lands continue to be looked to for providing open space, recreation opportunities, and quality of life aspects people associate with the area.

Map SE-1 shows the distribution of structures adjacent to the boundaries of the Wasatch-Cache. Structures shown by the dots are dwellings, commercial buildings, Forest Service administrative sites, and other constructed features. Not surprisingly, structures abut the forest nearly continuously along the Wasatch Front, and are heavily distributed in the Cache Valley near national forest lands. Even at the west end of the Uinta Mountains in the Kamas and the upper Weber River area structures are densely distributed, and becoming more common in the interface between private lands and the forest. While the Stansbury Range and north slope of the Uinta Mountains currently do not have the same density of structures on nearby lands seen elsewhere, it is expected that over the next 10-20 years this density should increase substantially.


Map SE-1 Structures in the Wildland Urban Interface
Structures
1:24,000 Quadrangle Bounday
Wasatch-Cache Administered Lands
Mountain View
Evanston
Kamas
Brigham City
Ogden
Salt Lake City
Tooele
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION

The magnitude of growth across northern Utah and southwest Wyoming vary somewhat and are displayed in table SE-2 and discussed below in some detail for counties that contain land administered by the Wasatch-Cache. (No discussion is provided for Wasatch or Duchesne Counties, as the acreage of Wasatch-Cache Forest system lands in these counties is relatively small. Most national forest lands in the county are within the Uinta National Forest, and effects to the counties are more related to management of that forest.)

Table SE-2. Population for Analysis Area and States, 1991-2000.

Area	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Change 1991-2000
	people										Percent
Box Elder, UT	36,864	37,317	37,882	38,541	39,077	39,802	40,751	41,571	42,378	42,872	16%
Cache, UT	72,924	75,794	78,390	81,134	84,006	86,326	88,002	89,866	90,299	91,625	26%
Davis, UT	193,773	199,199	204,936	210,164	214,622	219,687	224,871	230,937	235,912	240,259	24%
Morgan, UT	5,613	5,762	6,015	6,251	6,487	6,664	6,747	6,852	6,991	7,165	28%
Rich, UT	1,669	1,678	1,739	1,805	1,832	1,860	1,828	1,866	1,924	1,966	18%
Salt Lake, UT	751,023	774,408	798,049	819,039	836,008	853,076	871,580	881,840	891,116	899,698	20%
Summit, UT	17,124	18,406	20,247	22,044	23,902	25,297	26,634	27,970	29,004	29,976	75%
Tooele, UT	27,284	27,852	28,572	29,578	30,345	31,364	33,048	35,351	38,079	41,641	53%
Uinta, WY	19,101	19,476	19,581	19,927	19,884	19,936	19,935	20,029	19,901	19,707	3%
Weber, UT	162,186	166,479	171,055	176,032	180,546	184,584	188,334	190,846	193,697	197,264	22%
Analysis area	1,287,561	1,326,371	1,366,466	1,404,515	1,436,709	1,468,596	1,501,730	1,527,128	1,549,301	1,572,173	22%
Utah	1,779,780	1,836,799	1,898,404	1,960,446	2,014,177	2,067,976	2,119,784	2,165,960	2,203,482	2,241,555	26%
Wyoming	459,260	466,251	473,081	480,283	485,160	488,167	489,451	490,787	491,780	494,001	8%

Source: U.S. Department of Commerce, Regional Economic Information System, 2002.

Table SE-3 highlights the racial characteristics for comparison of the analysis area. As is common in counties throughout the rural west, county populations are not as racially diverse as the general population of the United States. Over the last decade there has been a net immigration from other states, and some foreign immigration, which has markedly increased ethnic diversity in the area, mostly in people of Hispanic or Asian/Pacific origins. Most of the counties make up very little of the total population of their State total with the exception of Salt Lake and Davis counties.

Table SE-3. Population Characteristics Compared for the United States, Utah, Wyoming and Analysis Area in 2000.

Area	2000 Population	Percent of State Population	White	Black or African American	American Indian and Alaska Native	Asian, Native Hawaiian and Other Pacific Islander	Some other race(s)	Latino or Hispanic, any race
	people	percent	percent of total population					
Box Elder, UT	42,745	1.9	92.9	0.2	0.9	1.0	5.0	6.5
Cache, UT	91,391	4.1	92.2	0.4	0.6	2.2	4.6	6.3
Davis, UT	238,994	10.7	92.3	1.1	0.6	1.8	4.3	5.4
Morgan, UT	7,129	0.3	98.1	0.0	0.2	0.2	1.5	1.4
Rich, UT	1,961	0.1	98.2	0.0	0.1	0.4	1.4	1.8
Salt Lake, UT	898,387	40.2	86.3	1.1	0.9	3.8	7.9	11.9
Summit, UT	29,736	1.3	91.8	0.2	0.3	1.0	6.6	8.1
Tooele, UT	40,735	1.8	89.2	1.3	1.7	0.8	7.1	10.3
Uinta, WY	19,742	4.0	94.3	0.1	0.9	0.3	4.4	5.3
Weber, UT	196,533	8.8	87.7	1.4	0.8	1.4	8.7	12.6
Utah	2,233,169	na	89.2	0.8	1.3	2.3	6.3	9.0
Wyoming	493,782	na	92.1	0.8	2.3	0.6	4.3	6.4
U.S.	282,124,631	na	75.1	12.3	0.9	3.8	7.9	12.5

Source: U.S. Department of Commerce. U.S. Census Bureau, 2002.

na = not available.

Total percentages for each county may add to more than 100 percent as people can select more than one race.

Table SE-4 highlights additional demographics of the analysis area. The median ages of county residents in the analysis area are significant lower median age in Utah as compared with the general population. All the analysis area counties have higher populations over 65 than state or national averages indicating the communities around the forest are attractive for retirees, or that people who live in the area, prefer to continue living in the area after they retire. The percent of homes used as second or vacation homes indicates that Rich and Summit counties attract part-time residents to the area. Family sizes are also larger in Utah than Wyoming or the US average. Part of the tendency for larger family sizes may be associated with the culture of members of the Church of Jesus Christ - Latter Day Saints that is prevalent in the state.

Table SE-4. Demographic Characteristics Compared for the United States, Utah, Wyoming and Analysis Area in 1989 and 2000.

Area	Average family size	Median age	Population 65 and over	Persons at or below poverty level, 1989*	Second or vacation homes
	people	years	percent of total	percent of total	percent of total
Box Elder, UT	3.63	28.0	10.4	7.2	2.2
Cache, UT	3.59	23.9	7.1	13.3	1.1
Davis, UT	3.67	26.8	7.3	7.1	0.3
Morgan, UT	3.81	28.5	8.7	8.6	2.5
Rich, UT	3.44	34.3	14.1	13.8	59.6
Salt Lake, UT	3.53	28.9	8.1	9.7	0.7
Summit, UT	3.30	33.3	4.8	7.1	35.0
Tooele, UT	3.51	27.1	7.1	11.3	1.2
Uinta, WY	3.31	31.4	7.0	8.5	3.0
Weber, UT	3.42	29.3	10.3	9.9	1.4
Utah	3.57	27.1	8.5	11.2	3.9
Wyoming	3.00	36.2	11.7	11.6	5.5
U.S.	3.14	35.3	5.1	12.8	3.1

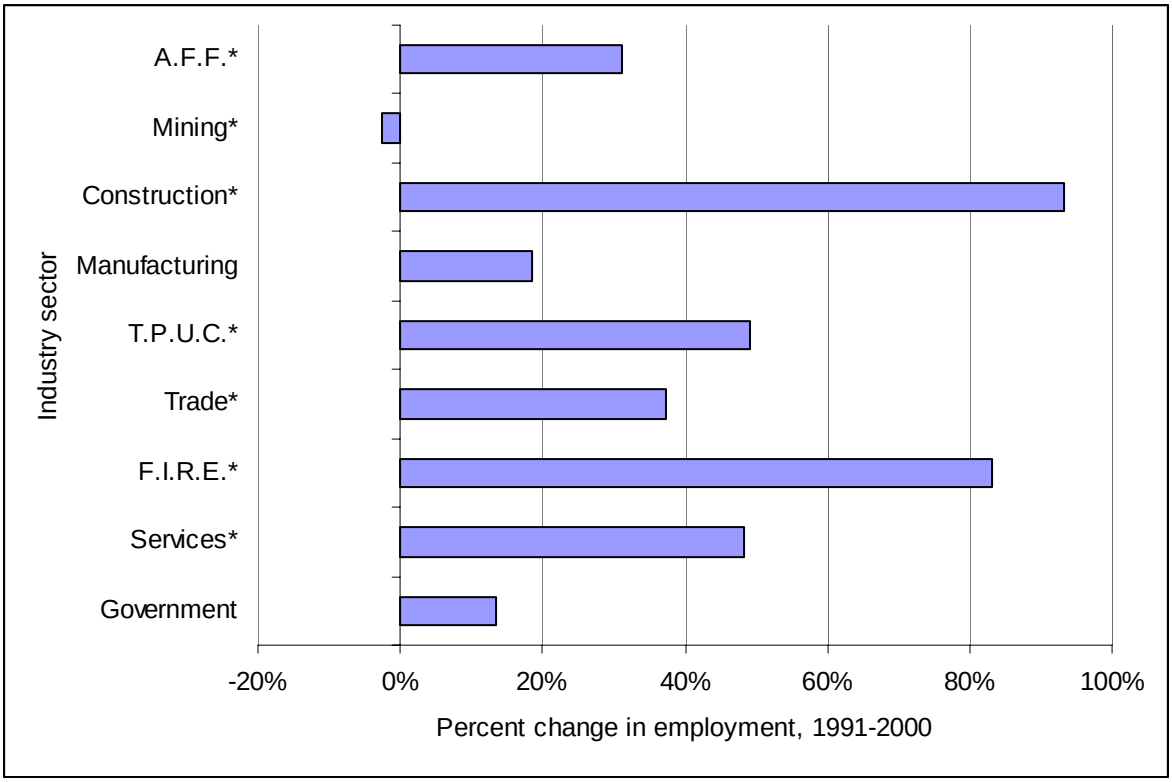
Source: U.S. Department of Commerce, U.S. Census Bureau, 2002. 1990 Census.

*2000 poverty statistics not available at this time.

Employment

With population changes and growth, employment within the analysis area has also been changing. Figure SE-1 highlights the change in employment by sector for between 1991 and 2000, for all counties in the analysis area combined (each counties separate analysis is available from the planning record). Individual counties within the analysis area show some degree of variability, but several trends are consistent.

Figure SE-1. Employment change by major industry between 1991 and 2000 for the Wasatch-Cache Analysis Area.



Source: U.S. Department of Commerce, Regional Economic Information System, 2002.
* Figures were estimated for Box Elder, Morgan, Rich, Tooele, Weber, and Uinta Counties due to disclosure regulations of employment and income data.

Sectors defined according to Standard Industry Classification Manual, 1987.

A.F.F. (Agricultural, forestry, and fishing services) includes all farming activity as well as businesses engaged in agricultural production, forestry, commercial fishing, hunting and trapping, and related services.
Mining includes the extraction of minerals occurring naturally, quarrying, well operations, milling, preparation at the mine site, and exploration and development of mineral properties.
Construction includes new work, additions, alterations, reconstruction, installations, and repairs of structures.
Manufacturing includes the processing of materials (products of agriculture, forestry, fishing, mining, and quarrying) into new products. Examples include food, textiles, mineral processing, lumber, wood products, furniture, paper, machinery, and appliances.
Trade includes all wholesale and retail trade. Wholesale trade includes the selling of goods to retailers or other wholesalers. Wholesalers maintain inventories of goods, extend credit; physically assemble, sort, and grade goods in large lots, break bulk goods into smaller lots and advertise. Retail trade includes the selling of goods for personal or household consumption and rendering services incidental to the sale of the goods. Examples include groceries, hardware, drug store, and other specialty stores.
Services include businesses engaged in providing a wide variety of services for individuals, business, government, and other organizations. Examples include hotels; health, legal, engineering, and professional services; and educational institutions.

F.I.R.E. (Finance, insurance, and real estate) includes business that operate in the fields of finance, insurance, and real estate, such as banks, investment companies, insurance agents and brokers; real estate buyers, sellers, and developers.
T.P.U.C. (Transportation, public utilities and communications) includes passenger and freight transportation, communications services, electricity, gas, steam, water and sanitary services and all establishments of the United States Postal Service.
Government includes all Federal, state, and local government employees involved in executive, legislative, judicial, administrative and regulatory activities.

Construction is the largest growth sector in the analysis and was increasing in all counties included in the analysis. This sector is associated with increasing population and overall growth of the area, residential and commercial buildings being constructed, as well as infrastructure required to accommodate the influx of people. In several counties the growth in second and vacation homes also increases the demand for construction activity.

Also associated with growth, the trade and services sectors increased in the last 10-years. All counties in the analysis area had increases in these sectors. Increasing population and construction also leads to increases in F.I.R.E. and T.P.U.C activity. Rich and Summit counties saw large increases in F.I.R.E. likely associated with second home construction and sales.

Manufacturing includes logging, sawmills and wood production, which are associated with outputs from the Wasatch-Cache National Forest. Processing of food and other production is also accounted for within this sector. Most counties in the analysis area show some increases in manufacturing employment.

Agricultural, forestry and fishing sector shows some increase in employment. Recent trends toward smaller operations being bought up and brought under management of larger corporations may account for some of the changes in employment. The figures highlighted do not account for seasonal trends or part-time labor within the agriculture sector.

The majority of government employment increases throughout the study area occurred within state and local education. In general, large increases have not occurred in this sector in any of the analysis area counties.

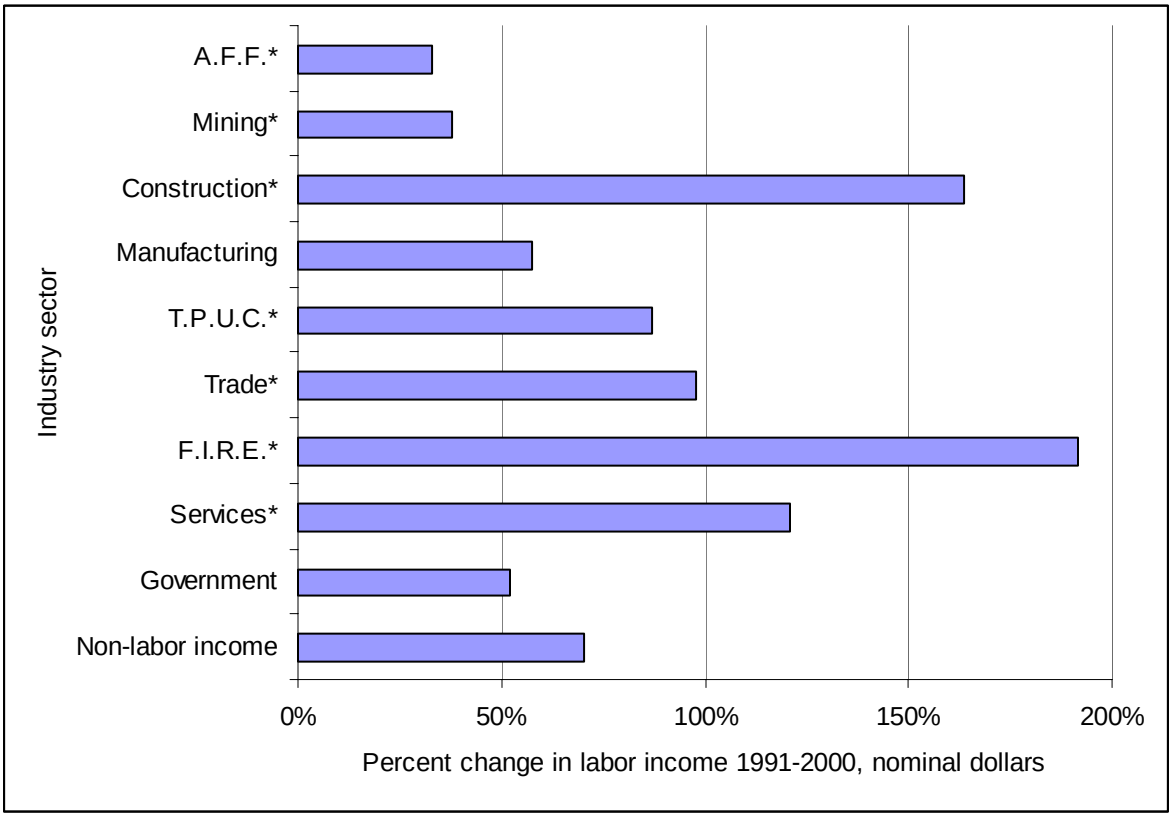
The only sector to show an employment decline within the analysis area is mining. While there is some mineral activity within the study area, most is not occurring on Forest lands. These changes seen within this sector are likely due to larger market forces impacting individual mineral and oil and gas industries. For more information concerning mining and drilling activity, refer to the minerals section of this FEIS.

Personal Income

Total personal income is comprised of non-farm income, farm income, property income, and Non-labor income. The largest component is generally non-farm income, which includes all wages and salaries that are not directly associated with farming activity. Farm income includes proprietors net farm income, wages and payments-in-kind for farm

labor, and salaries of officers of corporate farms. Non-labor income includes retirement and disability, income maintenance, and unemployment, property income made from rent, dividends, and interest from investments. Figure SE-2 highlights the percent change of total personal income by major sectors between 1991 and 2000 for the analysis area in 2000 dollars.

Figure SE-2. Total personal Income change in real 2000 dollars between 1991 and 2000 by major sector for the Wastach-Cache analysis area.



Source: U.S. Department of Commerce, Regional Economic Information System, 2002.
* Figures were estimated for Box Elder, Morgan, Rich, Tooele, Weber, and Uinta Counties due to disclosure regulations of employment and income data.

All dollars in Figure SE-2 have been converted to 2000 dollars to allow for direct comparisons without interference from inflation. Similar to the employment comparison, several trends are consistent across the counties of the analysis area. All counties show an increase between 1991 and 2000 in real non-labor income, generally associated with retirement payments. Retirees in a community can have a significant social and economic contribution. Economically, their income is an import of money into the community, there is not an associated job or export of product for wages. Retirees also have time and other resources to become involved in a community in terms of leadership, building community capacity, or other social programs that improve the well-being of the entire community.

The F.I.R.E. sector had the largest increase in labor income between 1991 and 2000 for the entire analysis area. The construction sector also had a large increase between 1991 and 2000. Similar to the employment trends, the increase in demand for housing and infrastructure related to increasing population is likely driving the growth in these sectors.

This agriculture, farming and fishing sector fluctuates year to year depending on various market conditions and prices so often trend analysis over short periods are difficult depending on if the beginning and end points were up or down years for the industry. In the case of this 10-year period, the analysis also includes a trend from many small farms toward a few larger corporate operations. Mining income, unlike the employment analysis, shows an increase in income between 1991 and 2000.

The remaining sectors show some growth in labor income, but in many cases the growth in income is smaller than the growth in employment. This highlights the lower wages and seasonal or part-time positions often associated with many sectors, especially trade and services jobs.

Per Capita Income

Annual per capita personal income (PCPI) in Utah in 2000 was $23,436 slightly lower than the national average of $29,469. Table SE-5 below displays the 2000 per capita personal income and average annual growth rate between 1990 and 2000 and the change between 1999 and 2000 for counties and states in the analysis area. Because per capita income is a measure of both income and population, smaller counties in Utah often show a lower change or growth than either the state or national average due to large family sizes. Summit County has a per capita income much higher than other counties in the analysis area, the state of Utah, and the national average.

Table SE-5. Per Capita Personal Income and percent change for the Analysis Area, 2000.

Area	2000 per capita Personal Income	1990-2000 change	1999-2000 change
	dollars	percent	
Box Elder, UT	22,321	3.9	5.8
Cache, UT	18,714	3.5	2.0
Davis, UT	24,100	4.9	5.6
Morgan, UT	21,995	4.9	5.9
Rich, UT	17,447	3.5	3.0
Salt Lake, UT	27,330	5.1	5.6
Summit, UT	40,528	5.7	4.5
Tooele, UT	18,542	2.2	4.8
Uinta, WY	22,042	4.1	4.1
Weber, UT	22,757	3.5	4.5
Utah	23,436	4.6	5.1
Wyoming	27,372	4.3	5.3
United States	29,469	4.2	5.8

Source: U.S. Department of Commerce, Regional Economic Information System, 2002.

Poverty

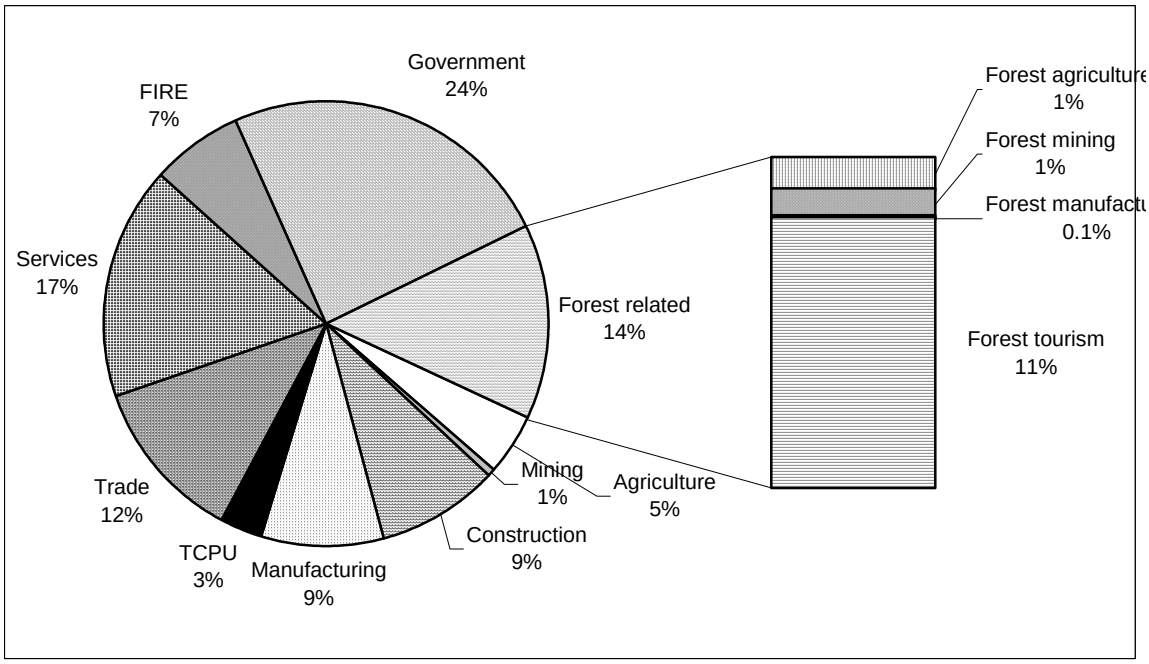
In 1997, 8.9 percent of Utah's population was in poverty with only 3.6 percent receiving public assistance. Only six other states had lower poverty rates. Utah has the eleventh highest percentage of homeowners in the nation at 72.5 percent (Utah, State of 2001b). Both these conditions indicate a relatively high standard of living.

Forest Resource Related Industries and Resources

This section focuses on industries that use forest –related resources: wood products, mining/processing, recreation and tourism, and grazing. These are the four industries that are directly dependent on forest-related resources and are the most likely to be impacted (positively or negatively) by Wasatch-Cache National Forest Management. These industries' production activities occur inside and outside the Forest, and in many cases, the Forest is not the only source of the forest-related resources.

Data for the following analysis is from IMPLAN Pro models (MIG 2000). This data allows for the separation of specific sectors and includes information not available from other state or Federal data sources. The trade-off is that the latest data available is for 1999. Other sources of 2000 data are available and were used in earlier descriptions of the economic conditions. Figure SE-3 displays employment by sector with forest-related employment summarized separately as the 'forest-related' category. The forest-related category includes employment in grazing (Forest agriculture), oil and gas drilling (Forest mining), logging and sawmills (Forest manufacturing), and visitor industry activities such as outfitter and guides, hotels, retail trade, and services that are supported by Wasatch-Cache resources or outputs (Forest tourism). For more information, individual sectors selected to represent each industry see Appendix B11.

Figure SE-3. Estimated Forest Service-related employment contributions within the analysis area, 1999.

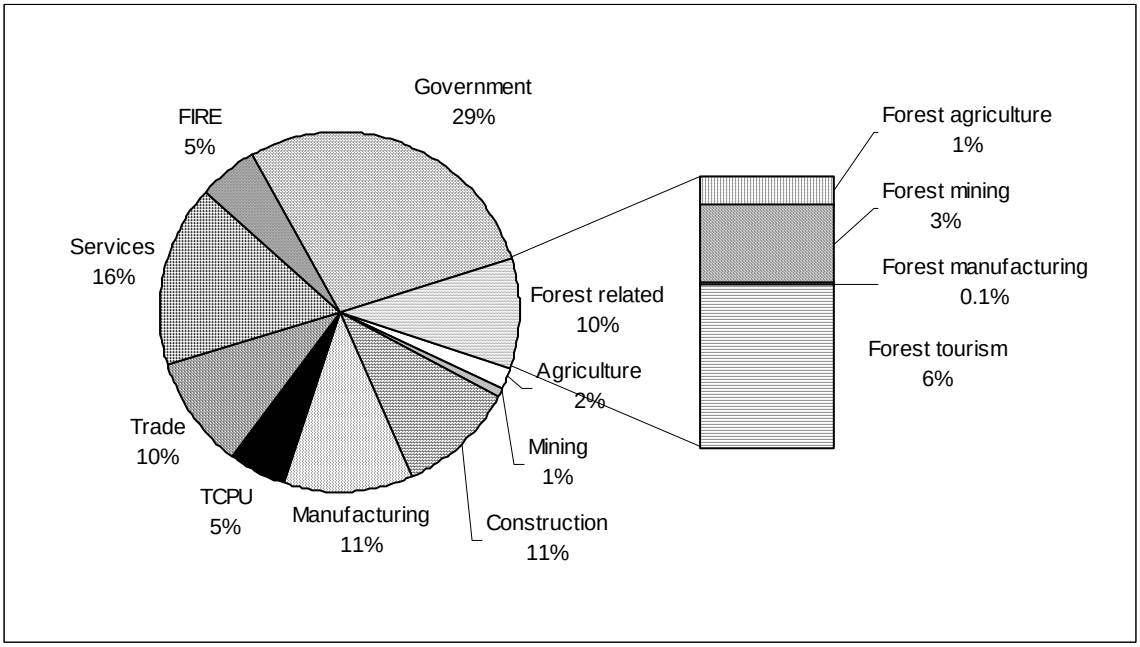


Source: MIG, 2002.

Within the analysis area, the employment estimated to be directly related the Wasatch-Cache National Forest activity is about 14 percent. The majority of forest-related employment is within tourism related activities. It is difficult to estimate all impacts specifically related to Forest management, this analysis is likely a conservative estimate of employment. Those counties with infrastructure for support and processing forest outputs are more likely to be impacted by changes in management. Summit County in terms of mining and recreation/tourism facilities, Uinta County in terms of grazing and wood production on the Forest, and counties with developed tourism opportunities will also have specific interests in Wasatch-Cache Forest management.

Figure SE-4 displays the contribution of Forest-related activities to the labor income of the analysis area economy. The outputs provided on the Forest are important to individual businesses and local communities, but in terms of the functioning economy surrounding the Wasatch-Cache, Forest-related outputs account for about 10 percent of the labor income. As discussed before, the difference between the employment portion and labor income is likely the differences in wages associated with the sectors. The recreation/tourism industry opportunities tend to be more seasonal and part time in nature with lower wages, accounting for less of the labor income than employment. The mining and manufacturing sectors tend to be the opposite, contributing the same portion or more labor income than employment due to higher wages and full time, year-round employment.

Figure SE-4. Estimated Forest Service-related labor income contributions within the analysis area, 1999.



Source; MIG, 2002.

The following analysis describes some historical trends and current situation of the four forest resource-related industries within the analysis area.

Timber

Today's national forest timber sale program differs dramatically from the program that existed only a decade ago (www.fs.fed.us/land/fm/tspirs/changing.html, 6/25/98, USDA-Forest Service, 1999). These differences have changed the role that timber production from national forests has played in national and regional economies. Closer to home and at a smaller scale there have also been reductions in the amount of timber available for sale and harvested (See Topic 6 – Timber Suitability).

Considerable new information on the local timber industry has recently been put together in a study entitled "Wyoming Timber Market Analysis: The New Western Timber Economy" (Rideout and Hesseln, 2000). The report includes the Wasatch-Cache National Forest in its study area. The study finds that restrictions based on pressures supporting amenity values on local forests, international market events, flatter domestic demand, and market conditions that favor highly capitalized processing are selecting against smaller and family owned mills. This condition is not unique to the local area, but is commonly found throughout the West.

The timber industry in northern Utah and southwest Wyoming is not a big contributor to the regional economy, but it has existed for a long time and is integral to local communities and those individuals directly employed within the industry. In northern

Utah, especially near the Wasatch-Cache Forest, there are few direct timber- related jobs as a percentage of total employment. A few small logging companies and mills are located in Evanston and Mountain View, Wyoming and in Kamas, Utah near the Forest.

Timber harvest on the Wasatch-Cache and related mill activities have been conducted for many years. In the past several years, bidders from outside the local areas have also begun to look at the Wasatch-Cache as a source for timber, and timber is being sold outside the local area and sometimes transported to mills as far away as Belgrade, Montana and Saratoga, Wyoming. Timber harvest levels have declined over the past decade, but have been relatively stable for the past three years (See Timber Affected Environment for specific analysis of timber harvest trends).

The most recent TSPIRS (Timber Sale Program Information Reporting System) report available for the Wasatch-Cache was completed for fiscal year 1998. This report highlights results of the timber program on the Forest. Based on information supplied to the TSPIRS reporting system, timber harvest from the Wasatch-Cache in fiscal year was 7.73 million board feet sold and awarded, with 2.56 million board feet harvested. This activity supported 64 annual average jobs and 3.2 million in labor income within the logging and sawmill sectors.

Figures SE-3 and SE-4 display the limited contribution of the wood products in the analysis area. Those jobs within the industry do tend to be higher paying, but subject to both the price swings in the wood-products industry and the swings in supply from local sources, including Forest Service.

Grazing

According to State of Utah Agricultural Statistics Service (Gneiting and Albert, 1999) overall cattle production in the State has been relatively stable since 1992. For sheep, lambs, and wool a general decline in production is noted over the same period, which reflects the broader economic situation for this sector of the economy.

Range use and demand for forage on the Wasatch-Cache have varied 10 to 20 percent over the last 15 years, but no clear trend in demand is recognized on the Forest (See Livestock Grazing/Range Management Affected Environment.) Cattle head months actually grazed on the Forest were 85 percent of the number authorized for the five years from 1995-1999, while for sheep for the same period the average head months grazed were at 80 percent of what was allowed. The Forest has more than 100 permits for range use, one of the most common permitted uses.

Because there has been a long tradition of grazing on the Forest and relatively large numbers of people have permits to graze, possible economic and also social/lifestyle effects to livestock grazing of Forest Plan alternatives are of considerable interest. Receipts collected for livestock grazing use on the Forest in FY 2000 were $89,959. In 2000 the value for the AUMs for cattle on the forest was $248,175 and the value for

sheep AUMs was $163,455. Grazing fees on the Forest have not increased per animal unit in the last four years.

Similar to the wood products industry, grazing is a small portion of both the regional economy and the local area. But to specific ranchers operating under permit on Forest Service lands, the continued opportunity to graze is important and can be vital to their year round operations. The livestock industry is also subject to the prices and supplies within a larger United States market. The relatively small operations within the analysis area do not influence these larger trends.

Leasable Minerals, Mineral Materials and Other Minerals

Oil and gas and coal are the most common minerals managed under leases, rather than by claims or sales. Oil and gas production companies bid to lease areas on the Wasatch-Cache National Forest that are made available for mineral leasing. Rental fees collected vary on the bids that are made, and the demand is sensitive to the potential of the area to produce as well as current markets. In 1999 the Wasatch-Cache collected rental fees on 72 oil and gas leases of 69,848 acres. The number of these leases does not vary much from year to year, but demand can vary as noted before. The fees collected from these leases amounted to $104,772 in 1999.

When a leased property produces oil or gas products, the federal, state, and local governments share royalties based on the value of the leasable minerals that are produced. In the five years from 1995 to 1999, the average value of the oil and gas produced from these leases was $11,060,035. Royalties paid to the federal, state, and local governments on this production averaged $1,549,230 for the same period of time. The federal government retains one-half of these royalties, and the other half is paid to the states to redistribute within the state and to the counties.

Mineral materials include sand, gravel, and rock. Year-end reports for the Wasatch-Cache National Forest show that the Forest rarely sells any common variety minerals, and therefore there is no local economic value to these resources. These materials are commonly purchased from local private sources. The Forest Service uses a small amount of mineral materials obtained from on Forest sources for roads and campgrounds for fill and maintenance. In 1999, the total value of these products used by the Forest Service was $3,858. Receipts to the government for these minerals on the Forest in FY 2000 were $372. The Wasatch-Cache has no producing mines for mineral ores or other hard rock minerals. For more information concerning general mining and oil and gas activity on the Forest, see the Minerals Affected Environment chapter.

Figures SE-3 and SE-4 attempt to separate out the oil and gas activity that occurs outside Forest Service lands, and that activity within Forest System lands. In this analysis, only crude oil is included. The figures highlight the importance of this mineral activity in the analysis area, whether on National Forest lands or private lands. The level of employment is relatively small, but the income associated with those jobs is significant.

Recreation and Tourism

There are a wide variety of recreation and tourism activities on the Wasatch-Cache (See Recreation and Tourism Affected Environment for specific details). The direct economic collections of developed recreation activities are relatively easy to derive as the Forest Service, concessionaires, or special use permits account for these dollars. However, the direct economic contribution and value to the economy of recreation and tourism activities are not easily derived and often have to be estimated. As discussed earlier, Figures SE-3 and SE-4 combine several sectors related to recreation and tourism activity, but because residents of the area also purchase similar goods and services, the amount of employment and income that can be allocated to tourism and recreation activities is difficult to estimate. The figures do not attempt to separate out local contributions from nonresident spending. The figures to indicate that the visitor industry is a large portion of the potential contribution of the Forest to the local economy, although the jobs are associated with lower wages and seasonal employment. The following describes trends and current situations of general recreation activities that occur on the Forest

Developed Recreation – Concessionaires currently operate most Forest Service campgrounds in the Wasatch-Cache National Forest under special use permits. These permits authorize concessionaires to operate and maintain these facilities, including collecting use fees that are used to cover costs of the operation and maintenance. The Forest Service charges concessionaires a fee for this private use of government-owned facilities, and special use permits generally allow costs attributable to landlord maintenance to be offset against fees owed to the Forest Service.

Hunting, Fishing and Wildlife Viewing – The wildland backdrop of the Wasatch-Cache is heavily used for these activities. All national forest lands are attractive for these activities due to the availability of habitat and the wildlife populations that use them, but the Wasatch-Cache is closer to large populations of users than any other forest. For this analysis estimations of the jobs related to these activities and their economic impacts have been calculated based on information provided in two documents: The Economic Values of Fishing, Hunting, and Wildlife Viewing on National Forest Lands (TRCA, 2000) and 1996 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (USDI, 1997). Estimates for the amount of use on the Forest are highlighted in the recreation section of this document.

Snowmobiles and ATVs - Counts of snowmobiles and ATVs in Utah are done by the Utah Department of Motor Vehicles. In the year 2000, nearly 70 percent of Utah's 27,440 snowmobile registrations were counted in the nine Utah counties that have generally been described in this document as those most closely related to the Wasatch-Cache; similarly 41,026 ATVs were registered in the same counties, or 59 percent of ATV registrations in Utah.

Utah's Division of Parks and Recreation completed a survey (prepared by Utah State University, Institute of Outdoor Recreation and Tourism) that assesses economic and social aspects of snowmobiling in Utah. This survey reports that the Hardware Ranch,

Logan Canyon, Monte Cristo area is the most popular in the state. (Appendix Q1) These sites are either on or immediately adjacent to the Wasatch-Cache, highlighting the need for management of motorized uses.

Annual expenditures for snowmobile activity by Utah residents in 2000 were estimated by the study to be $52.6 million. Mean expenditure per snowmobile was $1,621, while new purchasers (24.7 percent of the last year's snowmobile population) spent an average of $6,555 on their new machines. Expenditure and trip information from this survey was used to estimate the jobs and income impacts of alternatives within the analysis area and is documented in the planning record. While no similar information exists for ATV operation, a recent survey highlights that in Utah ATV owners paid about $4.8 million in property taxes in 2000. These survey results highlight motorized recreation as an active user group of public lands and an important contributor to local businesses.

Developed Ski Areas – About 52 percent of downhill skiers in Utah come from outside the state, while 48 percent are local customers (Wikstrom, 2000). The portion of the use that comes from outside the local area brings new dollars to the local economy and is important from an economic perspective. These non-resident skiers spend $207 per day when coming to ski; resident skiers spend much less on all categories of expenditures. Non-residents spend money on lift tickets, rentals, hotels and restaurants, and other miscellaneous items. Last year total spending by ski visitors in Utah reached $740 million, with additional indirect impacts of $436 million in increased earnings (Wikstrom, 2000).

The five ski areas on the Wasatch-Cache accounted for about half the total number of downhill skiers in the state and have about 1,240 permanent employees and 2,625 seasonal employees. From 1994-1999 annual receipts to the government from these five ski areas that currently have permits to operate on the Wasatch-Cache averaged $762,245. Details on skier visitation trends and ski area development projections on the Wasatch-Cache and adjacent ski areas are available in the Recreation Affected Environment of this document.

Revenues to the State

Under the 25 Percent Fund Act of 1908, counties receive payments from the federal government equal to twenty-five percent of all receipts taken in from National Forest lands within that county. The funds were to be spent on public schools or roads in the county. In October of 2000, the Secure Rural Schools and Community Self Determination Act of 2000 passed which changed the amount of these payments. Recognizing recent losses to many counties of income from reduction of traditional uses on federal lands and fluctuating payment amounts, the law allows counties to select a stabilized payment levels (their full payment amount based on the average of the three highest 25 percent payments made to the state between fiscal years 1986 and 1999), or continue the traditional 25 percent payment. All of the counties receiving funds from the Wasatch-Cache have selected the stabilized payments except for Rich County Utah.

Table SE-6 displays the full payments made to counties based on the Secure Payment language and the payments related to Wasatch-Cache National Forest receipts under Title I, II and III of the act and Rich Counties fiscal year 2001 payment. Title I funds are to be used for education and roads. Title II and III funds are required when counties receive a full payment of $100,000 or more. These counties are required to reserve no less than 15 and no more than 20 percent of the distribution for forest restoration, maintenance, or stewardship projects. Title II funds are to be spent on special projects and are intended to foster cooperation and consensus among a wide array of forest users. Title III funds are to be spent on county projects.

Table SE-6. 25 Percent Fund Payments to Counties from Wasatch-Cache National Forest, 2001.

	Wasatch-Cache Payment	Title I	Title II	Title III
Box Elder, UT	6,076	6,076	0	0
Cache, UT*	87,654			
Davis, UT	16,512	16,512	0	0
Morgan, UT	6,179	6,179	0	0
Rich, UT*	15,735			
Salt Lake, UT	41,938	41,938		
Summit, UT	217,877	185,196	0	32,682
Tooele, UT*	32,437			
Uinta CO, WY	16,107	16,106	0	0
Weber, UT	29,579	29,579	0	0

Source: USDA Forest Service, Washington Office. 2001.
*Cache, Rich, and Tooele counties in Utah did not select secure payments, so payment amount shown is fiscal year 2001 payment made based on Forest revenues..
Payments to Duchesne and Wasatch County from Federal Government not shown as counties are considered out of the analysis area.

Under the Payments in Lieu of Taxes (PILT) Act of 1976, counties receive payments from the federal government for having federal lands within their counties to make up for lost revenues. Congress appropriates PILT payments based on a complex formula developed at a national scale using population and acreage of federal lands and the value of other federal revenues as key factors. The final annual PILT appropriation is not only based on the formula but is also sensitive to politics and other national funding priorities from year to year. Due to the complexity of the development of PILT payment values, past PILT payment amounts should only be used as a general indicator of possible future PILT values, and never as a guarantee of future revenues to counties. For the preceding reasons, changes in individual forest plans may not be good predictors of local PILT payments (Bill Howell, WO-BLM, personal communication, July, 2000). Table SE-7 displays the amounts of PILT payments to counties in fiscal years 1996 - 2001.

Table SE-7. PILT payments to counties from Federal Government, fiscal year 1996-01.

Fiscal year	Box Elder, UT	Cache, UT	Davis, UT	Morgan, UT	Rich, UT	Salt Lake, UT	Summit, UT	Tooele, UT	Uinta, WY	Weber, UT
	nominal dollars									
1996	913,117	181,113	22,131	10,817	82,822	63,267	342,193	729,890	423,299	43,253
1997	853,087	172,860	21,468	10,214	83,343	60,008	324,470	712,895	403,938	41,415
1998	864,414	179,324	24,582	10,630	84,764	59,528	323,752	726,699	403,554	45,903
1999	887,078	164,699	19,770	10,303	84,332	64,874	345,816	747,505	419,356	36,592
2000	938,662	188,351	25,407	11,765	92,313	71,236	380,674	828,955	443,216	45,225
2001	1,345,476	274,719	34,960	16,212	142,611	97,951	523,941	1,360,622	631,772	69,696

*Payments to Duchesne and Wasatch County from Federal Government not shown as considered out of analysis area.

For counties in the Wasatch-Cache analysis area, funding from PILT and 25 percent fund payments are used as part of funding for county budgets. Table SE-8 shows to what extent these revenue sources supported county governments in 1999, an example of a recent year. A very low percentage of county funding in urban counties is provided from these revenues. In all cases PILT and 25 percent payments made up less than 9 percent of total county revenues in 1999.

Table SE-8. County Budgets and Federal Payments from PILT and 25% Fund (1999)

County	Total County Budget	PILT	25% Fund Payments	Total budget from Federal Funding	County Budget from Federal Funding
	dollars in 1999				percent
Box Elder, UT	10,111,314	887,078	9,111	896,189	8.86
Cache, UT	12,059,059	164,699	104,873	269,572	2.24
Davis, UT	28,802,782	19,770	14,945	34,715	0.12
Morgan, UT	4,274,664	10,303	5,616	15,919	0.37
Rich, UT	1,705,819	84,332	18,323	102,655	6.02
Salt Lake, UT	223,979,905	64,874	37,819	102,693	0.05
Summit, UT	16,865,528	345,816	198,117	543,933	3.23
Tooele, UT	21,086,738	747,505	62,801	810,306	3.84
Uinta, WY	15,091,065	419,356	15,292	434,648	2.88
Weber, UT	28,144,463	36,592	25,334	61,926	0.22

Source: County budgets in Utah from Utah State Auditors Website, www.lgr.sao.state.ut.us/1999%20County%20Budgets_1. Uinta County Website, www.webcom.com/ucedc/county/budget99.

Environmental Consequences

The impacts of the alternatives are projected based on Forest Service expenditures and the estimated outputs in five program areas of forest management: recreation/tourism, range, wildlife and fish, timber, and minerals. The output levels used for this analysis represent the projected 10-year average for the planning period. Resource specialists have provided estimates based on the best available information and professional judgment. Additionally, because complete information about the area economies was not available, it was necessary to make a number of assumptions in order to conduct the analysis. Where pertinent to the discussion of effects, some of these assumptions are explained below. More information about the assumptions and processes used to conduct the analysis is provided in Appendix B11, Forest Plan Revision Process.

The nine-county scale of analysis represents the region of economic and social relationship and interaction with the Wasatch-Cache National Forest and its management policies. The analysis model incorporates county level data into the regional scale and generates results at the regional level. Because of this, economic effects at any smaller combination of counties, or an individual county, were not generated and cannot be inferred from the analysis results.

Because of limited data, the need for modeling assumptions, limits to the model itself, and other factors, the most important use of the results is to compare relative economic effects among the seven alternatives analyzed in detail (the current condition is also displayed in addition to the seven action alternatives). The results should not be viewed as absolute economic values that accurately portray the infinitely complex economic interactions of the regional economy, but as an estimate of potential effects.

The economic sections of the analysis consider the potential effects to market-related goods and services that are traditionally related to national forests, for which monetary values are available, and for which analysis tools are generally accepted. Passive use values have not been quantified. Therefore, the analysis considers the possible economic impacts of alternatives to timber, livestock grazing, mining, and recreation. It does not consider many other “amenity” values for which monetary values and analysis techniques are less clear. These are mainly comprised of existence, bequest, option and quasi-option values.

Existence values refer to the amount an individual would be willing to pay to preserve an old-growth forest stand, for example, even if they had no intention of ever visiting it. Bequest value refers to the amount individuals would be willing to pay to preserve the stand for the enjoyment of their children or future generations. Option value refers to the premium risk-adverse individuals would be willing to pay in excess of their expected surplus to ensure the future availability of the stand in an environment of uncertainty. Quasi-option value arises because there is uncertainty about the future value of a natural resource. Information about the value of the resource is revealed only with the passage of time.

While the passive values associated with the Forest as a whole are no doubt considerable, and the Forest Service recognizes the tremendous value of these kinds of items, they are extremely difficult to accurately measure, particularly on the per acre basis, which would be needed in order to make a comparison among alternatives. Analysis methods to quantify them in an economic analysis are also not readily available or agreed upon. Such values are described and considered qualitatively within the social and other individual resource sections of this document. Additional assumptions and the derivation of value estimates by alternative are included in Appendix B11.

Financial and Economic Efficiency

Financial and economic efficiency are analyzed in this section. Financial efficiency examines revenue and cost implications from the perspective of the Forest Service. It could also be said that this is the perspective of the taxpayer. Only those revenues and costs that are recorded in financial records are included in this analysis.

When considering quantitative issues, financial efficiency analysis offers a consistent measure in dollars for comparison of alternatives. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and costs that are not easily quantifiable. This is not to imply that such values are not significant or important – but to recognize that non-market values are difficult to represent with appropriate dollar figures. The values not included in this part of the analysis are often at the center of disagreements and the interest people have in forest resource projects. Therefore, financial efficiency should not be viewed as a complete answer but as one tool decision makers use to gain information about resources, alternatives, and trade-offs between costs and benefits.

Economic efficiency examines a broader definition of benefits by including values for national forest uses that are not captured in the marketplace. Many non-market and passive use values are excluded from the economic efficiency analysis completed here. Some outcomes of effects, such as biological diversity, visual amenities, and some social impacts have no monetary values or costs that have been established by USDA or the Forest Service. While some research studies have explored the development of such values, this analysis has considered these items in a non-monetary fashion in the other resource sections of this EIS. Willingness-to-pay values for recreation use are the primary additions over a financial analysis. Estimated market value for meat gained by grazing livestock on public land is also included. See Appendix B11 for a description of values used in the economic analysis.

Net public benefit is an important concept in the current regulations for carrying out a forest plan revision. Net public benefit is defined as the overall value to the nation of all outputs and positive effects (benefits) minus all the associated Forest Service inputs and negative effects (costs) for producing those primary benefits, whether they can be quantitatively valued or not. Thus, net public benefits conceptually are the sum of this economic analysis plus the net value of non-priced outputs and costs. It is not the results of an economic analysis alone. This concept is the basis upon which the Regional Forester selects an alternative for implementation. Net public benefits are discussed in the Record of Decision.

The main criterion used in assessing financial and economic efficiency is present net value (PNV), which is defined as the value of discounted benefits (or revenues) minus discounted costs. A PNV analysis includes all outputs, including timber, grazing, and recreation, to which monetary values are assigned. As noted above, the monetary values include both market and non-market values received by the public. In deriving PNV figures, costs are subtracted from benefits to yield a net value. "Future values" (i.e., benefits received in the future) are discounted using an appropriate discount rate to obtain a "present value." The PNV of a given alternative is the discounted sum of all benefits minus the sum of all costs associated with that alternative. PNV, as required by NFMA (36 CFR 219) estimates attempt to condense a large amount of information into a single value, they must be used with caution.

Table SE-9 displays the economic and financial PNV for each alternative. All dollars are in constant dollars with no allowance for inflation. A four percent discount rate was used over a period of 50-years (2002-2051). While the planning horizon for the forest plan is 10-15 years, the PNV analysis considers costs and benefits into the future to account for long-term benefits and discount costs. While the question of the appropriate discount rate to use is debatable, the four percent level is consistent with what is commonly used in evaluation of public policy. Revenues are not reduced for payments made to states and counties. The reduction of PNV in any alternative as compared to the most financially or economically efficient solution is the economic trade-off, or opportunity cost, of achieving that alternative.

Forest Service budgets have been held constant over the planning horizon. Specific allocation differences between resource programs were made based on each alternative's emphasis. Based on estimated resource outputs by alternative, the level of revenues to the Forest Service change by alternative.

Table SE-9. Economic and financial efficiency (PNV) estimated by alternative for 50-year planning horizon, in millions of dollars.

Value	Alternative							
	Current	No Action	1	2	3	5	6	7
	- - - - - - - - - - - - present value, million of dollars- - - - - - - - - - - -							
Forest Service revenues	172	173	158	163	137	174	139	140
Public benefits	14,135	14,867	14,779	14,820	14,851	15,089	14,860	14,868
Costs	-417	-417	-417	-417	-417	-417	-417	-417
Financial PNV	-245	-244	-259	-254	-280	-243	-278	-277
Economic PNV	13,718	14,450	14,362	14,403	14,434	14,672	14,443	14,451

Source: USDA Forest Service 2002b, Quick-Silver.

As shown in Table SE-9, the financial PNV (Forest Service revenues minus costs) for the budget level varies little between the alternatives, with alternative 3 being the most negative, -$280 million to Alternative 5 with a total of -$243 million. All alternatives do show negative financial PNV, indicating that costs of Forest Service management are estimated to be greater than the revenues taken in over the next 50 years. What appears to make Alternative 5's financial PNV the highest is the higher levels of timber harvest

and grazing associated with the alternative. Alternatives with preservation emphases such as 1 and 6 show the highest net cost to the taxpayer, because there are fewer agency revenues associated with these activities associated with the alternatives while expenses remain the same.

The economic PNV (public benefits minus costs) is positive for all alternatives. The net value ranges from a low $14,362 million for Alternative 1 to a high of $14,671 million for Alternative 5. There is only a 2 percent difference between the lowest and highest PNV—a difference that may be indistinguishable given estimated accuracies for value and output estimates. The net economic benefits are orders of magnitude larger than the financial gross revenues. This suggests that even with the limited monetary values available for the analysis, society benefits greatly from implementing any alternative fully considered in this document.

Distribution Analysis

Distribution analysis is not concerned with costs and benefits directly, or with direct values of resources, but with the equity in which resource are distributed. In essence, it is the balancing of local, regional, and national uses. By identifying local impacts and being aware of national values, decision makers can balance the benefits and costs among geographical, political, social, ethnic, and economic sectors of society. In this analysis, the distribution of potential impacts within the analysis area is considered from several perspectives, impacts of employment and labor income by alternative, and environmental justice. The following analysis is one of the many tools decision makers will use to compare the relative difference among alternatives.

Employment and Labor Income

The following analysis and discussion examines the potential effects of alternatives on employment and labor income opportunities within the analysis area. Although in many cases the differences between the alternatives are relatively small, the impact may be considerable to individual communities, persons, families, or businesses. Within small communities, the loss of a single job can be very important, even though the impact across the analysis area is negligible.

The IMPLAN model was used to estimate complex economic relations in order to approximate the effects of each alternative on the economy as a whole. The IMPLAN model is an input output model that estimates and uses multipliers as a means to estimate the change in direct, indirect, and induced effects as a result of an adjustment in the level of final demand for the goods or services provided by a given sector of the economy. These multipliers also take into account the effects of leakage and imports.

The employment and income estimated should be viewed as resource opportunities, not as actual jobs the alternatives will provide. The impacts estimated are based on the assumption of full implementation of each alternative. The actual changes in the economy will depend on individuals taking advantage of resource-related opportunities

supported by each Forest plan alternative. If market conditions, or trends in resource use are not conducive to developing some opportunities, the impact on the economy will be different than estimated here. The results highlighted below only account for jobs and income related to Forest Service outputs, the figures do not represent total industry participation or activities associated with other resources outside the Wasatch-Cache.

Leakage occurs when money must be spent outside the analysis area in order to fulfill production needs – if a local restaurant requires seafood for production of dinner, the money spent in Washington or Oregon for fresh salmon is considered a leakage. The money has left the analysis area and is no longer available for circulation within the local economy. Imports to the local area are basically someone else's leakage – when non-residents enters the analysis are for a weekend of skiing, all the money spent is considered new money, or an import to the economy.

The following tables estimate the potential impact of each alternative on the employment and labor income in the analysis area. The model estimates how many jobs and associated income would be necessary in each sector to fulfill the resource demand of each alternative within the analysis area. The jobs estimated are not necessary new employment – the tables display the total employment (direct, indirect, and induced) needed to produce each alternative's resource output. The current situation highlights the level of employment and income that is currently associated with Forest activities, so the difference between alternatives can be compared to current operations.

It is also important to note that in the IMPLAN model, jobs can be part-time, full-time or seasonal. In this analysis, jobs are not the same as a Full Time Equivalent (FTE). This is important to consider when looking at these job figures that only the portion of an industry related to forest outputs will be accounted for in the analysis. For example, if there were 350 grazing permittees within an area, those jobs may be represented by only 75 jobs in the Forest Planning model because these operations do not graze solely on Forest Service lands. The analysis only accounts for that grazing output on the Forest and then adds all jobs together so the 75 jobs represents the employment of the 350 permittees while operating on the Forest.

Table SE-10 displays the estimated annual average employment within the analysis area. All alternatives show similar results with a change of 305 potential jobs between the highest and lowest alternative. Alternative 5, emphasizing traditional commodity production, estimates the largest increase in jobs from the current situation, and Alternative 1 estimates the least increase. A portion of the potential increase is due to the assumption of full implementation of all alternatives, while the current situation is reflective of actual budget and personnel limitations encountered annually by all Forest Service offices.

Table SE-10. Average Annual Employment by Program by Alternative (Decade 1)

Resource	Current	No Action	1	2	3	5	6	7
	Alternatives							
	- - - - - - - - average annual employment, jobs- - - - - - - -							
Recreation/tourism	5,510	5,982	5,960	5,977	5,993	6,002	5,993	5,993
Wildlife and fish	80	88	88	88	88	88	88	88
Grazing	35	35	33	29	35	35	33	34
Wood products	60	60	0	18	25	63	33	37
Minerals	89	89	52	52	210	251	210	227
Forest Service expenditures	393	393	394	392	392	392	392	392
Total forest management	6,167	6,647	6,527	6,556	6,743	6,831	6,749	6,771
Percent change from current	---	8%	6%	6%	9%	11%	9%	10%

Source: MIG 2002.

The majority of all jobs estimated for the alternatives are within the recreation and tourism program. Most of these jobs are likely to be seasonal and associated with the retail or service sectors. The differences between the alternatives in the recreation/tourism program are due to management prescriptions allowing for developed recreation such as ski areas and ski area expansion or other facilities that increase the number of users within an area.

The grazing program outputs are based on averages of actual use over a ten-year period adjusted by alternative based on suitable acres and forage utilization allowances. Alternative 2 assumes the least suitable range resulting in total AUMs of 84 percent of the current average, and a potential decline in associated jobs. Although actual AUMs are projected to change by Alternative, permitted AUMs will not change as a result of Forest Plan Revision. Adjustments to permitted numbers depend on site-specific monitoring, analysis, and decisions.

Timber harvesting is an important component of each alternative. Alternatives 5 and 7 manage timber as a commercial resource while other alternatives highlight timber harvest as a tool used in achieving forest health and restoration goals. Employment associated with timber harvesting includes logging of the trees and local milling. In some cases, such as urban interface fuels reduction projects, the trees harvested are often too small to be used in sawmill operations so employment is limited to logging of the material.

Available lands for mineral exploration and continued oil and gas drilling vary depending on the emphasis and management of each alternative. Alternatives 1 and 2 minimize the level of activity and thus the associated jobs while Alternatives 5 and 7 expand mineral opportunities and jobs. For individual resource, see the resource section in this document for specific output information and descriptions.

Table SE-10 displays the estimated annual average labor income within the analysis area by resource program. The labor income differences by alternative show similar trends as the employment figures with limited variability between alternatives. The largest portion is within the recreation/tourism program. Alternative 5 estimates the largest change, 14 percent, from the current level of labor income associated with higher outputs and activities. Alternative 1 estimates lowest labor income when compared to the current level. Again, because of the assumption of full implementation of the alternatives, all show positive change from the current situation, which is constrained by actual budget.

Table SE-11. Labor Income estimated by Program by Alternative (Decade 1)

Resource	Current	Alternatives						
		No Action	1	2	3	5	6	7
	- - - - - - - - average annual, in millions of dollars- - - - - - - -							
Recreation	108.2	117.6	117.0	117.4	117.8	117.9	117.8	117.8
Wildlife and Fish	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Grazing	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5
Wood products	1.4	1.4	0.0	0.4	0.6	1.4	0.8	0.8
Minerals	4.5	4.5	2.6	2.6	10.6	12.6	10.6	11.4
Forest Service expenditures	12.4	12.4	12.4	12.5	12.5	12.5	12.5	12.5
Total forest management	128.6	138.2	134.3	135.1	143.8	146.7	144.0	144.8
Percent change from current	---	7%	4%	5%	12%	14%	12%	13%

Source: MIG 2002.

Environmental Justice – Civil Rights

A specific consideration of equity and fairness in resource decision-making is encompassed in the issue of environmental justice and civil rights. As required by law and Title XI, all federal actions will consider potentially disproportionate effects on minority or low-income communities. Potential impacts or changes to low-income or minority communities within the study area due to the proposed action should be considered. Where possible, measures should be taken to avoid negative impacts to these communities or mitigate the adverse affects.

As highlighted in the Affected Environment of this section, there are few minorities within the study area and no communities are considered low-income. While there are individual households that are either minority or low-income, the communities as a whole are not.

Payments to the State

As highlighted in chapter 3 of the social and economic analysis, all counties within the Wasatch-Cache National Forest analysis area except Cache, Rich, and Tooele counties in Utah have selected stable payments under the secure payments legislation. There will be

no changes in payments to states by alternative to those counties selecting stable payments. Cache, Rich, and Tooele counties will continue receive a portion of Forest revenues, Table SE-11 highlights historical payments by program to these counties. Funds from timber harvesting and salvage are a significant portion of the related payments; it is likely any alternative with lower timber activity may return fewer funds to the counties. Grazing has been fairly stable over the last three fiscal years, contributing a similar amount to the county payment; since all alternatives have allotment use similar to current this trend will continue. Current land uses, power lines, and special uses are not significantly impacted by any of the alternatives, but several limit future ski area developments and expansions that may limit future county payments. Finally, the fees from recreation have been declining and will likely continue to do so under all alternatives as the Forest Service moves toward concessionaries and Fee Demo. These collections are not included in payment calculations.

Table SE-12. Cache, Rich, and Tooele counties Utah, 25% payment, fiscal year 1999-2001.

	Cache County			Rich County			Tooele County		
Revenue category	FY99	FY00	FY01	FY99	FY00	FY01	FY99	FY00	FY01
				nominal dollars					
Timber	51,448	33463	92,332	8,988	6,006	16,574	256	4,906	4,714
Grazing	25,006	25,660	24,750	4,368	4,606	4,443	4,687	4,792	4,392
Land use	4,308	3,128	5,017	752	561	900	22,314	4,118	1,858
Recreation Special Use	44,850	30,158	47,964	7,835	5,413	8,610	203,929	173,787	13,303
Power Line	7,529	7,204	7,344	1,315	1,293	1,318	773	789	801
Minerals	0	0	0	0	0	0	64	66	956
Recreation Fees	15,258	13,753	5,477	2,665	2,468	983	137	155	291
KV/Salvage	271,093	138,697	167,731	47,364	24,897	30,099	25,535	18,278	9,922
Total revenues	419,492	252,063	350,615	73,291	45,247	62,928	257,695	206,891	136,237
County 25% payment	104,873	63,016	87,654	18,323	11,312	15,735	64,424	51,723	34,059

Source USDA Forest Service 2001c.

Economic Cumulative Impacts

The revision process estimates potential economic effects of alternatives in the short term. There are no reasonably foreseeable future actions within the analysis area that would significantly impact current uses of the area in the future. In some cases, jobs and income related to one type of resource development may be forgone in order to emphasize or manage an area for a different resource output; other types of jobs and income will be associated with this alternative management. Individuals may be adversely impacted by selection of one alternative over another, but in the larger, regional economy, each alternative offers a different mix of opportunities to the area.

Social Impact Analysis

This section covers social impacts that more often occur off national forest lands. Effects of alternatives to recreationists and other users that occur directly on the Forest (in recreation, from other commodity development activities, through Wilderness

designation, vegetation management, wildlife habitat management, fire management, and watershed management) are described in sections devoted to these topics.

The social impacts section has three parts.

First, effects related to Issue 4. This issue was developed to deal with economic and social values. The effects of alternatives on several kinds of uses (livestock grazing, timber harvest, oil and gas leasing, and ski areas, and recreation), as portions of the economy, and use interactions have been described previously. Aspects of these uses, which have a social effect on lifestyles of people involved in livestock grazing, timber harvest, oil and gas work and recreation will be addressed in this section. A narrative discussion of the effects of alternatives is provided for these affected forest users. We recognize that the public has a broad range of values and interests in how national forest lands are managed, and that this section cannot likely meet every individual's or group's expectations or concerns. What is provided are some general observations on the probable effects of the alternatives to relatively intangible social values described in Issue 4.

Second, effects related concerns raised by individual counties. A narrative is provided which describes effects to concerns raised by individual counties that were voiced during information gathering for this analysis. Effects to American Indians in the vicinity are also discussed.

Third, a discussion of potential cumulative effects is provided for an interpretation of the longer-term general effects of population changes, demographic shifts, increasing diversity, and social issues related to forest plan decisions.

Effects of Alternatives on Social Conditions related to Livestock Grazing

While projected AUMs are not grossly affected for cattle and only moderately affected for sheep, suitable acres do change by alternative, having implications for how livestock grazing is to be managed and distributed. Depending on current conditions of an individual allotment and how suitable acres are distributed, actual AUMs may change and management requirements may affect permittee operations. Increased needs for riding and fence construction and maintenance apply to all alternatives that reduce suitable acres. In Alternative 7, the 30-40% forage utilization guideline for lands in unsatisfactory condition will require additional diligence on the part of permittees to keep use levels within the allowable. This may mean more time spent managing livestock on the forest making less time available for other pursuits.

Those permittees whose allotments are in areas recommended for Wilderness for example can expect that any existing motorized access under their Term Grazing Permit for proper management of livestock can continue at least until such time as

Congress acts. However some recreationists may complain about this access because it is not available to the general public.

Alternatives 1, 2, 3, 6, and 7 close all or some currently vacant allotments. As these allotments are not currently used, there should be no short-term social effects associated with this change from current status. Long-term, closed allotments will provide ungrazed areas for those who enjoy recreating in areas lacking the influence of domestic livestock grazing.

Those groups or individuals who do not favor the use of national forests for livestock grazing could be more satisfied with alternatives that reduce suitable acres and/or projected AUMs. However the differences in terms of presence of livestock grazing and accompanying environmental effect are expected to be minimal from a recreation setting or aesthetic perspective.

Effects of Alternatives on Social Conditions related to Timber Harvest and Vegetation Management

Projections for timber harvest levels vary by alternative as presented in the Timber section. While most local mills have adapted to decreasing or intermittent supply from federal lands by increasing purchase from other suppliers, further adaptation might be required under alternatives all alternatives except 4 and 5. Similarly, if decreased supply projections equate to some effect on social patterns associated with those people employed by mills or in logging, then alternatives that show reductions in harvest might have some minor effect on related social patterns.

Emphasis on the forestwide subgoal for vegetation composition and structure (trending toward historic range of variability through increased prescribed burning, wildland fire use, or mechanical treatment) may also affect local social conditions. Alternatives 2, and 3, 6 and 7 to a lesser extent, increase forest vegetation management efforts by increasing the acres treated by the techniques mentioned above. Some new Forest Service jobs or some contract opportunities to accomplish these vegetation management goals could be created. The economic modeling has included higher values for Forest Service budget in these alternatives related to these activities.

Those groups or individuals who do not believe the Wasatch-Cache should be open for commercial timber harvesting might be more satisfied Alternatives 1 and 2 that limit harvest to restoration related activities.

Effects of Alternatives on Social Conditions related to Oil and Gas Leasing

Alternatives, 3, 5, 6, and 7, provide for some additional oil and gas leasing with differing stipulations on the roadless areas of the North Slope. Projections for production differ by alternative (See Oil and Gas section.) For Summit County, additional county revenues would

be realized on royalties, taxes and other income, but few additional jobs are actually projected (See Economics section.) Uinta County would probably also see a few additional jobs, but might see less county revenue increases, as much of the producing area is in Utah.

Socially, any changes to the makeup of communities in Summit or Uinta County or from the selection of any alternative, would be very minor. No major oil boom or bust will result from any alternative; there will be no substantive increase in population, jobs, or diversity as a result of any alternative related to oil and gas leasing.

Those groups or individuals who do not believe that roadless areas on the North Slope should be leased will be aggravated if a decision to lease part or all of the area is made. These people will likely protest or appeal a decision to lease in roadless, believing that irretrievable losses of ecosystem will be made.

Effects of Alternatives on Social Conditions related to Recreation

For recreation, the Alternatives largely vary on the amounts of motorized versus non-motorized recreation available, particularly as relates to winter snowmobile access.

Businesses dependent on motorized recreation (ATV and snowmobile dealers, gas stations) and segments of society whose lifestyles are related to motorized recreation use will favor Alternatives 3, 4, 5, and 7. These alternatives maintain acres and trails available for motorized access and uses about where they are today, or try to expand motorized uses where possible, which would appeal to these people. Alternatives 1, 2, and 6 limit snowmobile use in roadless areas and recommended wilderness, which may be offensive to the motorized group of users.

Alternatives 1, 2, 6, and, 7 which provide protection for roadless areas, and limit the use of snowmobiles in these areas, will appeal to segments of society who (as a rule) do not favor the use or expansion of motorized recreation, but prefer non-motorized, small-group outdoor recreation activities or protection of ecosystem components from what they perceive as threats to their uses or the natural system.

For outfitter-guides, all alternatives except the No Action Alternative provide new criteria for assessing the need for outfitter guides. Most individuals or groups that have an interest in outfitting and guiding on the Forest ought to be pleased with the specificity provided in these criteria for assessing proposals. Some individuals and groups do not favor providing outfitting and guiding services on the Forest; while they may have preferred that any potential for new outfitting and guiding be closed off, these individuals may also be pleased to find the criteria provided for assessing proposals.

Socially, various user groups have strong preferences for different kinds of recreation, and their acceptance or rejection of the adequacy of any alternative to meet their needs seems relatively straightforward. Predicting individual responses to these alternatives is very difficult.

Effects of Alternatives on Social Conditions related to Ski Areas and Heliskiing

Alternative 5 is the only alternative that allows increased acreage for ski resort permits. The other alternatives do not. Because of this, Alternative 5 ought to appeal to the ski resorts, or to those groups or individuals who support more opportunity for developed ski resorts and businesses. For individuals or groups who do not want additional allocations for ski area expansion (for ecosystem, other recreational opportunity, simply maintaining the status quo, or a variety of other reasons) other alternatives would seem more socially acceptable.

Alternatives 3-7 allow heliskiing, in about the same locations where it is currently allowed. Individuals who enjoy heliskiing and the owners of this business will find these alternatives in their favor. Alternatives 1 and 2 do not allow the continuance of heliskiing on the forest, after the current permitted use expires. Opponents of heliski use will probably support a decision that would choose Alternative 1 or 2.

Effects of Alternative Wilderness Recommendations on Social Conditions

In Utah, as in much of the west, the issue of whether to have more Wilderness or not is most often polarizing. The actual physical merit of an area (its "capability") is often not the major question at hand. Rather, the historical context in which former battles over Wilderness have been waged and the intrenched positions of key individuals bear equally as heavily on the question. Any Wilderness recommendation is perceived as too much by some, while smaller recommendations are thought to be environmentally irresponsible by others. An attempt to find some middle ground is difficult. It is likely that the choice for any alternative will be unsatisfying to many.

Wilderness advocates tend to prefer Alternative 1 with the largest Wilderness recommendation; conversely, those opposed to more Wilderness (motorized use and access enthusiasts, advocates of timber, oil and gas, and livestock grazing use) are highly opposed to these recommendations. At the other end of the spectrum, Alternatives 4 and 5 are preferred by those opposed to more Wilderness, as none is recommended; advocates for more Wilderness are highly opposed to these alternatives. In between these two extremes are Alternatives 2, 3, 6, and 7, at least with respect to Wilderness recommendation. Each of these alternatives can be said to be more or less acceptable to opposing segments of society depending on the amount of Wilderness recommended, or not, and the choice for any of these alternatives would carry with it acceptance or discontent by different affected groups.

Effects of Alternative Roadless Area Management on Social Conditions

How roadless areas should be managed in the future – to maintain their "natural" ecosystem functions, or to be more actively managed or developed - has been a key public issue in this forest plan revision. This forest plan revision effort has been contemporary with and heavily affected by the Roadless Area Conservation Rule 36 CFR

294 (RACR). See other sections of this document for more detailed information on implications of the rule. Public debate on roadless area conservation, both in this forest plan's revision forums and at the national scale has been contentious and polarized.

Different individuals and groups of people experience solitude, serenity, spiritual renewal and a variety of other positive emotions in different ways. The kinds of wildland settings and personal or group experiences that provide positive fulfillment to some users are not fulfilling for others. Families and groups with differing traditions about how they recreate, use, or otherwise see value in public lands are fervent about their desires to preserve those values they see as shrinking or threatened. This section is intended to disclose how the alternatives may affect or be perceived by groups with differing personal/social values.

Alternatives 1, 2, and 6 applied the RACR protections to all roadless areas (no timber harvest, no road building). Roadless area values are fully protected in Alternative 1, nearly as much so in Alternative 2, and to a lesser extent in Alternatives 6 and 3. The selection of any of these alternatives with larger Wilderness recommendations or more roadless acres maintained, reduced areas available for motorized use, emphases on ecosystem functions and restoration, setting aside additional wild lands for more primitive forms of use, as a refuge for species/wildlife, would appeal to segments of society where these values were held high.

Alternatives 5 and 4 allow development (road construction, timber harvest, new recreation developments) in most roadless areas; within the parameters of forest plan standards and guidelines. The selection of either of these alternatives would appeal to segments of society that value these uses. These alternatives are probably more amenable to social groups who make a living through commodity production based on using national forest lands. Advocates for motorized use, winter and summer, would find these two alternatives better suit their personal needs.

Alternatives 3, 6 and 7 tend to be more middle of the road with respect to societal values on roadless area management, resulting in neither full maintenance of identified roadless area values (See Appendix C-2), or in more developed uses in roadless areas. Alternative 7 examined and evaluated roadless areas for unique and individual values and recommends management for each roadless area with more information and knowledge of environmental and social context than do the other alternatives. Because of this Alternative 7 might appear to have some advantage to others in terms of public support, however, it is unlikely that a choice for this alternative would satisfy a large majority of the public.

Effects on Social Conditions from Fuel/Vegetation Treatment

Alternatives that have more opportunities and acres identified for mechanical fuel treatment (Alternatives 3, 6 and 7) would have more of an impact on social conditions. Residents in the wildland-urban interface would be impacted by mechanical fuel treatment designed to mitigate fire behavior. Residents would be encouraged to complete

fuel treatment actions on private land in areas adjacent to where fuel treatment occurs on public land. Some residents may not be supportive of fuels reduction actions because of reduced perceived scenic quality resulting from more open-growing vegetation. Using local contractors to complete mechanical fuel treatment work would positively impact the local economy. This impact would be greatest when local contractors are used in less-populated communities.

Other effects on social conditions from fuel treatment in the wildland-urban interface are the reduced risk of severe wildland fire burning homes or causing landslides where fuel treatments have been accomplished. See section on "Effects on Social Conditions from Fire Management" for additional discussion.

Effects on Social Conditions from Fire Management

Fire management actions have the potential to greatly impact social conditions with the most impacts from large wildland fires. Since most communities surrounding the Wasatch-Cache NF do not heavily rely on timber production from federal lands, the impact of wildland fire burning suitable timber stands would be minimal. However, many residents surrounding the forest choose that location because of the scenic and remote qualities. Following a large wildland fire, perceived scenic quality is greatly reduced in the short-term. Additionally, risks of substantial erosion are greatly increased. This would affect home and property values, and may be costly or devastating to homeowners (in the event of homes burning and/or severe landslides). It is difficult to determine which Alternatives would have more risk of homes burning or severe landslides. Alternatives 1 and 4 have the least managed fuel reduction actions in the wildland-urban interface and therefore may have the highest potential risk and related impacts. In small communities, the use of local contractors for fire suppression actions (caterers, equipment rentals, drivers, etc.) may benefit local communities.

The social impacts of prescribed fire and wildland fire use would be minimal and do not significantly vary across alternatives.

Potential Effects on Concerns Raised by Counties

Meetings with each county were conducted to assess what counties were interested in related to national forest management during the early stages of this analysis. Some of this information is presented in the Affected Environment section above. This section describes effects to counties based on what was said to be of interest during these information-gathering meetings.

Box Elder County

Under any alternative watershed for the community of Honeyville is protected. Ongoing travel management planning in eastern portions of the county adjacent to the Wasatch Range has been conducted with the Forest Service. Summer travel management planning for routes is separate from this Forest Plan; however, it is expected that further interactions between the county and the Wasatch-Cache will occur, and the Forest

Service is interested in county concerns for the area related to resource impacts, safety, and on and off road vehicle use.

Cache County
Cache County planning personnel indicated (as heard in scoping meetings with the general public) that there was a broad range of opinions in the county on forest planning issues. Effects of alternatives on Wilderness proposals, winter and summer motorized and non-motorized use, roadless area management, livestock grazing, and protection of rivers eligible as Wild and Scenic Rivers are presented in those sections.

As population grows and development continues in Cache County, demands on Forest lands will continue to rise. Socially, this may be contentious as users interact with competing demands; it is also possible that local users may see the need to come to terms with one another and help find common solutions.

Davis County
In Davis County watershed protection has been provided in every alternative to ensure protection of downstream uses. In Alternatives 3 and 5 the intent is to provide additional recreational opportunities for motorized and developed uses respectively, while continuing watershed protection. All action alternatives employ new fire management direction with more emphasis on the use of prescribed and wildland fire use.

Morgan County
All alternatives provide substantial protection of watershed conditions above Mountain Green on the southeast portions of Mt. Ogden.

South of I-15 access from the east side to the Wasatch Front has been limited (across private lands). In the revised Forest Plan written to express Alternative 7 conditions the Desired Future Condition states that any existing access will be maintained, and if not present, that public access would be acquired. Providing new access to the backside of the Wasatch Range here would provide quicker access to undeveloped recreation opportunities in the area. It might also mean some increase in traffic during highest use periods through county areas to the forest.

Rich County
Few, if any, social effects will be noted in Rich County from any alternative. A continuance of existing land-use opportunities are provided. No changes in current allotment status are presented in any alternative. Timber harvest opportunities, while not available in Alternative 1 are present in other alternatives at or near the current low production levels. For the most part, local social and economic activities with dependency on the Forest have not been changed.

Salt Lake County
In Salt Lake County critical watershed values are protected under each alternative. The alternatives also provide for protection of scenic values (as the scenic backdrop is an important amenity for residents.) In the county there has been considerable controversy

between those interested in continuing heliski opportunities and those who oppose this activity. Alternatives are presented which support either position. Attempts in project level analyses to resolve this conflict have not been successful. The Proposed Forest Plan provides an objective for Tri-Canyon planning refinement with a collaborative group, which is intended to address this need.

Similarly, general social controversy has revolved around the extent to which new development in the canyon is appropriate. Alternative 5 allows for additional acreages for some ski-area permits and more allowance for recreational facilities development, while other alternatives do not.

Continuance of cooperative ventures with local and county governments for fire protection, law enforcement, and recreation management (e.g. Mill Creek) are not decisions made in this plan. These arrangements are mutually beneficial to all agencies and governments involved to cut costs and increase services to the public, and no changes are projected for them.

Summit County

Protection of municipal watersheds above the Kamas Valley are provided under all alternatives, which has been a stated objective of town and county officials in Summit County.

The county is also interested in the economic and social effects of forest management, as well as cooperative planning with the Forest Service. The Wasatch-Cache will be interested in engaging county in discussions under any alternative to consider mutual needs or the specific needs of the county.

Summit County receives revenues (as do other counties) from royalties and receipts related to activities on the Wasatch-Cache. Under Alternatives 3, 5, 6, and 7 which support larger potential for oil and gas production these revenues have a higher probability for larger returns; while revenues approximately equal current revenues are probable under Alternatives 1, 2, and 4.

Under all alternatives Summit County will probably continue its rapid population growth and development. It is unlikely that a decision to implement any of the alternatives presented in this analysis would change this scenario.

Tooele County

Under any alternative county officials can expect continuing interaction and cooperation with the Wasatch-Cache. Continued interagency planning on watershed and fire management can be expected.

Under Alternatives 3, 5, 6, and 7 some additional emphasis on developed recreation and controlling and channeling motorized recreation would occur, which would favor remarks that the county provided during interactions with the Forest. These alternatives, as well as the Desired Future Condition in the Draft Forest Plan, call for a more active

recreation presence and management in the Stansbury Range. Tooele County is interested in expanding and coordinating with the Forest Service in providing outdoor recreation opportunities for its residents and other visitors.

County officials might not favor Alternatives 1, 2 and 3 that recommend more Wilderness in the Stansbury Range.

Weber County

Weber County and its towns and cities recognize that watershed protection is a valuable component of the national forest management, which is provided for in all alternatives. Similarly, interactive fire planning will also occur, no matter which alternative is selected. Continuing cooperation in planning for urban front trails will also occur.

The Monte Cristo and Curtis Creek areas are recognized as valuable winter snowmobile range, which is provided for in each alternative, in somewhat different amounts, dependent on the degree to which roadless areas and wildlife corridors are protected during winter.

The Snowbasin area development is not a decision related to forest planning. No new allocations of land are planned for Snowbasin under any alternative.

Uinta County, Wyoming

Uinta County has been particularly interested in interacting with the Wasatch-Cache on forest planning. The County and its Resource Committee have cooperating agency status with the Forest Service for forest planning. (Also see section below on Consideration of plans of other federal agencies, states, local governments, and Indian tribes.)

Uinta County's position has been consistent that 1) Forest Plan decisions should not negatively affect current livelihoods that derive from the Forest, 2) that some enhancement of economic opportunity on the Forest can be accomplished while still providing responsible land stewardship, and 3) that current motorized access be maintained. The county has not been supportive of recommendations of additional Wilderness.

Given these considerations, the County is not supportive of Alternatives 1 and 2, which provide for considerable additions to Wilderness. Similarly, but to a lesser extent, Alternatives 3 and 6 are also not favored. Alternative 5, which provides for some additional economic opportunity through timber harvest, no Wilderness recommendation, and continues existing access would seem to be most in line with the situation described as desirable by the Resource Committee. Parts of Alternative 7 may be acceptable to many in the county, as it identifies some areas for timber harvest and other vegetation treatments that had been recommended for roadless protection in earlier alternatives, but the county is not supportive of any recommendation for Wilderness.

The County's Resource Committee has expressed that existing lifestyles in the area have great value, and that Forest Plan decisions should not negatively affect this. While

specific criteria were not developed to look at how current lifestyle is affected, it is clear that lifestyle in the county, as well as across the several county planning areas, is changing. Forest Plan decisions are not likely to change lifestyle nearly so much as other factors that are outside the realm of Forest Planning. The cumulative effects section, which follows addresses some of the larger forces that may affect Uinta County lifestyles.

American Indians

During scoping, no specific issues related to forest planning were raised by the American Indians described in the Affected Environment. Nevertheless, through discussions with line officers, some consideration of conditions generally favorable or not to American Indians are inferred.

Skull Valley Band of Goshute Indians
Additional Wilderness is recommended for the Deseret Peak Wilderness in Alternatives 1, 2, and 3, although in decreasing amounts with each alternative. As our line officers understand that additional wilderness is favored by the Goshutes, each of these alternatives would generally support their values. Alternatives 4, 5, 6, and 7 have no additional Wilderness and probably would not be favored. Under each alternative cultural remains, sites and values are protected by federal law and proposed forest plan management direction. No reductions to current grazing are anticipated under any alternative in the Stansbury Range, maintaining current opportunities for economic uses.

Northwestern Band of Shoshoni
Alternatives 1, 2, 3, 6, and 7 all recommend additions to designated Wilderness. Discussions with the Northwestern Band of Shoshoni indicate that they are interested in Wilderness designation; therefore, these alternatives might support tribal intentions better than Alternatives 4 and 5. Under each alternative cultural remains, sites and values are protected by federal law and proposed forest plan management direction. Recently recorded prehistoric sites near the Northwestern Band of Shoshoni' reservation, as well as others that have been known for some time, will be protected under any alternative.

Northern Ute
As with the aforementioned tribes, the Northern Utes are interested in maintaining access to and protecting traditional gathering sites and ceremonial areas, and sites. Under any alternative these uses and rights are recognized. Additions to all Wildernesses, but particularly to the Uinta Mountains are provided in Alternatives 1, 2, 3, 6 and 7. It is likely that alternatives that support larger Wilderness additions would be more favorable to the Northern Utes than those that have little or none. Water rights, an item of expressed interest to the Northern Utes, are not affected by this Forest Plan's decisions.

Consideration of plans of other federal agencies, states, local governments, and Indian tribes

36 CFR 219.7 requires that the results of a review of other plans be presented in the analysis of effects. The Forest Service has made various efforts during this forest plan

revision process to understand and consider the policies and perspectives of other agencies and governments. As stated above, county planners for each county were consulted regarding their key concerns in the development of the forest plan revision, and these concerns were carried forward in the development of alternatives.

The States of Utah and Wyoming, as well as several counties commented on the DEIS, and their letters are published in Appendix A. No comments were received from Indian Tribes, although some meetings were held with tribal leaders during the planning process to identify tribal concerns. In addition, for Uinta County, Wyoming and Summit County, Utah cooperating agency status was established by a Memorandum of Understanding. In general for all counties in the planning area, management direction in the Revised Wasatch-Cache Forest Plan is compatible with goals and objectives of these local governments.

For Uinta County, Wyoming, a specific review of the County's land use plan was conducted. The Forest Service's plan and planning process is generally consistent with the County plan. Uinta County plan goals and objectives usually call for interaction with federal agencies in planning processes so that county concerns on any topic are aired, understood, and considered in federal decisions. On certain items (Wilderness recommendation, timber harvest levels, opportunities for oil and gas leasing in more areas, any further limitation of recreation access, restrictions on predator control, and the general effects of all preceding items on overall cultural patterns) the County is concerned that a forest plan written for Alternative 7 is not in the County's best interests, even though the planning process has met most County plan goals for interaction.

Social Cumulative Effects

Population

The rapidly expanding population will create more demands on the Wasatch-Cache over the next two decades. Population growth will further reduce the available open space in urban areas adjoining the Forest, increasing demand for opportunities to recreate and to escape urban environments. As urban areas expand, more and more people will experience lifestyle changes as rural environments recede. With expanding urban influences, residents are likely to experience higher levels of government influence in their lives, further exacerbating some current resentment toward governmental restrictions and their impacts. The growing list of management actions and restrictions on activities and uses within the Forest required by the Endangered Species Act, the Clean Water Act, and other Federal legislation may also serve to further agitate local governments who believe that too much local control has been lost.

Demography

Urbanization and development sprawl will occur over the next decade along the Wasatch Front, in the valleys on the backside of the Wasatch Range and adjacent to the north slope of the Uintas. While local urban, county, and regional planners and the public are making progress in refining the kinds of development that are desirable and recognize

some of the inherent costs and effects associated with sprawl, nevertheless, growth, even if abated, will continue in some form, and overall density will increase.

The interface of both primary homes with the Wasatch-Cache boundary will become more frequent along the Wasatch Front, and of ranchettes, trophy homes, and seasonal homes in sparsely populated areas. This development and filling in of open space will reduce universal access to these public lands. In addition, this interface of private homes with wildlands will create new threats from brush and forest fires and a demand for protection of lives and assets.

Diversity

Ethnic diversity will increase if current trends continue, and perhaps at an even faster rate. Different ethnic groups have been shown to have preferences for different types of recreation and use. But diversity in user demand, (not ethnically related) will also affect the Wasatch-Cache. Just as the previous Forest Plan did not anticipate mountain biking or snowboarding; we can be sure that new technology will develop that will increase the diversity of demands on the Forest. Legally and correctly, a responsive attitude will exist in the Forest Service in the near future to try to provide for the variety of cultural and use preferences stated by our public, while still sustaining underlying resources.

"Second Paycheck"

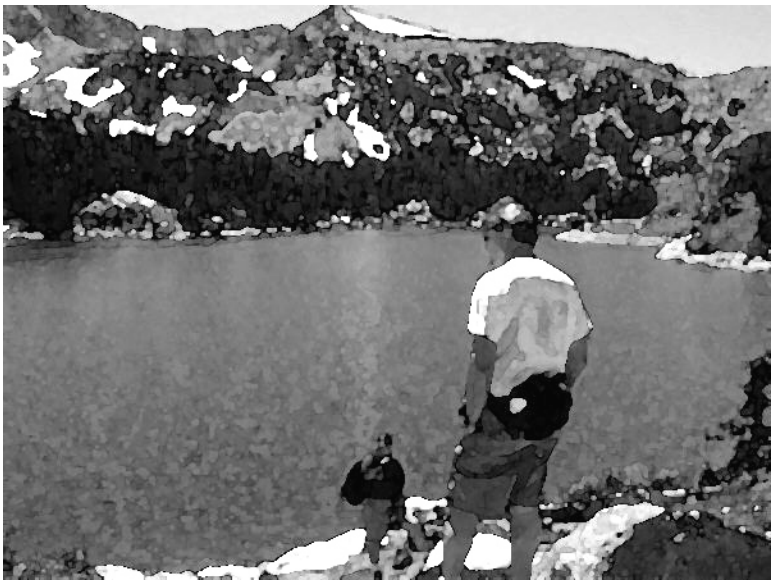
The "second paycheck" concept applies to the recognition that amenity and quality of life values associated with living near large tracts of well managed and attractive public land is a real benefit to many residents – in fact, a "second paycheck" (Dave Iverson, Intermountain Region, personal communication, 3/2001). A few people have moved to Utah or other parts of the West simply for these amenity values, while many others are at least attracted by these opportunities, among their other considerations. If current trends in American life continue, there will be a tendency to more competitive workplace situations, more complexity, and greater demands placed on individuals in their workplaces. For this reason, the "second paycheck" ought to increase in value over the next generation, and people will increasingly be interested in the management of public lands – as they see it in their own personal interests to be involved and attempt to direct the outcomes of public lands decisions.

Wilderness and Wild and Scenic Rivers

Alternatives currently under consideration would recommend the additions to all seven Wildernesses on the Forest, and add a new Wilderness. Other forests in Utah will begin their revisions in the coming years. Each will need to address recommendations for Wilderness and Wild and Scenic Rivers. These wildland congressional designations have been among the most difficult for society to make regarding public lands. Political forces, emotions, and values are strong on either side of these allocations, and no clear outcome is yet on the horizon. The public, land management agencies, and politicians at every level have become weary with the debate. It is likely that efforts at forming coalitions of diverse interests will be attempted with hopes of resolving these questions.

Roadless Areas

The choice for how roadless areas on national forests will be managed is a key local, regional and national issue that has substantial importance in assessing cumulative effects on naturally evolving systems and human uses. For many people who seek to preserve the resource values they most treasure, protective designations and rules are a welcome change to current forest management policies. Cumulatively however, many of these changes may limit the region's capacity to satisfy the rapidly growing population's desire for some types of recreation opportunities and other uses. Frustrations may grow for individuals who prefer opportunities such as heliskiing or using ATVs as the opportunities they seek become crowded by other users and management attention turns to reducing user conflicts. It will become increasingly difficult to provide the same wide range of recreation opportunities that have been available in the past as the number of users increase and uses on the already limited space available are further constrained. Those with economic ties to forest resources will likely find it increasingly difficult to locate alternative sources on neighboring public lands. Growing numbers of forest users, conflicting objectives, and the overriding need to ensure ecosystem health and sustainability will require compromise on the part of all involved to resolve differences. Increased strain between user groups in many cases will be unavoidable.



Lands, Real Estate and Property Boundary Management

Introduction

Management of the landownership pattern of the Wasatch-Cache NF involves survey and marking of landlines and other boundaries, exchange of lands with private parties and non-Federal government entities, and acquisition of access rights-of-way. These activities would continue under all alternatives because they contribute to increase overall management efficiency regardless of alternative emphasis.

Laws, Policy, and Direction

- **The Transfer Act (1905):** transferred the Forest Reserves to the Department of Agriculture.
- **The Weeks Law (1911):** Provides for land acquisition, exchange, condemnation and rights of way easements. Lands acquired by the United States under this act are reserved and not subject to appropriation under mineral law except as provided by the Secretary of Agriculture.
- **The General Exchange Act (1922):** authorizes land adjustments within National Forest boundaries.
- **The Color of Title Act (1928):** authorizes the Secretary of Agriculture to recognize and adverse possession of public land under claim or color of title based on designated conditions.
- **The Land Acquisition – Declaration of Taking Act (1931):** provides condemnation authority to the United States.
- **The Department of Agriculture Organic Act of 1956:** provides additional land purchase authority.
- **The Land and Water Conservation Fund Act (1965):** provides for funds for the acquisition of lands and interests in lands.
- **The Sisk Act (1967):** provides for the exchange of lands with states and local governments.
- **The Federal Land Policy and Management Act of 1976:** provides additional direction for land acquisition and exchange.
- **The Small Tracts Act (1983):** provides for the sale, exchange, or interchange of certain parcels of minimal size.

Acts Specific to the Wasatch-Cache National Forest

- **The Uintah-Wasatch Receipts Act (1935):** provides annual funding for purchase of lands in a designated portion of the Ashley, Uinta and Wasatch-Cache National Forests.
- **The Cache Receipts Act (1938):** provides annual funding for purchase of lands in the old Cache National Forest.

Three Purchase Units, previously designated, are in effect on the Wasatch-Cache National Forest. A Purchase Unit Designation provides direction to the Forest concerning purchase opportunities within the designated boundaries. These are:

1. Davis County Purchase Unit - Salt Lake Ranger District, Wasatch-Cache National Forest
2. Ogden Purchase Unit - Ogden Ranger District, Wasatch-Cache National Forest
3. Tri-Canyon Purchase Unit - Salt Lake Ranger District, Wasatch-Cache National Forest

Affected Environment

Purchases and Donations

The Forest Service consults with other Federal, State and City governments on landownership adjustment planning. Table LN-1 displays the purchases and donations during the last decade. Past experiences show two or three land purchases are typically completed each year on the Forest. An average of between 40 and 80 acres per year are purchased. National policies and funding influence accomplishments. Local issues such as public access to NFS lands, wildlife habitat, watershed protection, Forest boundary management, and recreational opportunities have determined priorities and parcel selections. National initiatives such as the Great Western Trail and the Bonneville Shoreline Trail also establish priorities for land and ROW acquisitions.

LA-1. Purchases and Donations 1990-2000

YEAR	CASE	ACREAGE	FINAL TITLE
1990	Lorna Cole 1 Land Purchase	13.25	1990
1991	Lorna Cole 2 Land Purchase	25.00	1991
1991	Lorna Cole 3 Land Purchase	15.00	1992
1992	Naomi B. Hulse Land Purchase	36.27	1992
1994	Wellsville Mountain/Hawkes Land Purchase	229.75	1995
1994	Deaf Smith/Buningham/Pehrson Land Donation	41.32	1995
1995	Taylors Cove/TPL I Land Purchase	37.40	1996
1995	Alta/Sarah Daft Home Land Donation	33.98	1996
1995	Taylor Canyon/Lorna Cole Land Donation	16.00	1996
1996	Mt Naomi/Melville Land Purchase	20.66	1997
1996	Mule Hollow/Wolfe Land Purchase	10.96	1997
1996	Taylors Cove/TPL II Land Purchase	80.00	1997
1997	Rice Creek Springs Land Purchase	134.11	1998
1998	Albion Basin/Cummings Land Purchase	1.30	1999
1998	Albion Basin/Murphy Land Purchase	0.31	1999
1998	Silver King/Hunt Land Purchase	82.01	1999
1999	Homestake/Olwell Land Purchase	45.82	2000
1999	Heughs Canyon/Cannon Land Purchase	96.65	2000
2000	Napoleon/Maghera Land Purchase	118.97	
2000	Timberwolf/Sanford Irrigation Land Purchase	10.00	
2000	Last Thance/Coupens Land Purchase	17.35	
	TOTALS	1,066.12	

Land Exchanges

Land exchanges have also resulted in changes in landownership patterns. LA –2 displays land exchanges completed from 1990 through 2000.

LA-2 Land Exchanges 1990-2000

YEAR	CASE NAME	FEDERAL ACRES	NON-FEDERAL ACRES	FINAL TITLE
1990	Black Creek Associates	590.33	632.83	1995
1993	Farmington City	0.94	59.50	1993
1996	Chournos	440	440	1996
1999	State of Utah	2,278.61	18,356.83	1999
1999	Salt Lake Office	5.51	4.17	2000
2000	Snow Basin	1.379.60	11,757.03	2001
	TOTALS	4,694.99	31,250.36	

LA-3 Small Tracts Act Cases 1990-2000

YEAR	CASE NAME	FEDERAL ACRES	FINAL TITLE
1992	Stirling Wood	0.03	1992
1994	Gundy Chidester	0.05	1994
1996	Gordon Owen	0.08	1996
2000	Dickenson	0.06	2001
	TOTALS	0.21	

Access to National Forests and Encroachments

Rapid population growth in northern Utah has increased development within and along the Forest boundary. The result has been a loss of historical access to public roads and trails and increased encroachment.

There are currently more than thirty identified and suspected encroachments (unauthorized use of national Forest System lands) cases on the Forest. Some of these encroachments include improvements such as buildings, recreation facilities, gardens, etc. The Forest is maintaining posted boundaries, and is identifying opportunities to use land exchanges and purchases to establish a more identifiable boundary along roads, trails and ridgelines.

In 1995, the National Forest in Northern Utah completed a Rights-of-Way (ROW) Acquisition Plan identifying a need for 119 rights of way access on the Wasatch-Cache National Forest. During the period since 1990, more than 54 ROW easements have been acquired, mostly through land purchases and exchanges. The Forest has also cooperated with and encouraged cities and counties to acquire ROWs within their jurisdictions, especially where a right has been established through prescriptive use under Utah State law. The Forest will continue to encourage

maintenance of existing and acquiring new access to the National Forest. There are areas of the National Forest that do not currently have legal access. The Forest will continue to attempt to acquire access through those areas where it is not now available.

Surface and Mineral Ownership Pattern

In a number of areas on the Forest, especially where lands were re-acquired by the United States, a mixed surface and mineral estate ownership pattern has occurred. There are 78,734 acres within the Proclaimed National Forest boundary where the United States does not own the surface rights but does own the sub-surface rights (mineral estate). Federal Minerals under private surface are primarily located within the designated Forest Boundary on the southern portion of the Logan Ranger District, and the eastern portion of the Ogden Ranger District.

There are 10,611 acres where the United States owns the surface estate and the State of Utah owns the mineral estate. There are 33,835 acres where the United States owns the surface rights and private citizens or corporations own the mineral estate. These areas occur throughout the Forest, but concentrations are found on the southern portion of the Logan Ranger District, the Eastern portion of the Ogden Ranger District, and the tri-Canyon Area of the Salt Lake Ranger District.

CHAPTER 4 – LIST OF PREPARERS

Over the several years of the forest planning process there have been changes in the make up of the interdisciplinary team and the forest leadership team. Individuals have moved to other jobs in other locations or local reassignments have been made as needed to enhance the forest planning effort or to address other forest work priorities.

Contributors shown below are either currently contributing to the completion of the forest planning effort, or contributed meaningful input at some time to this planning process.

Interdisciplinary Team

Core interdisciplinary team members at time of the release of this document are shown with an asterisk (*). Other interdisciplinary team members were not on the core team, but played important professional or technical support roles now or in the past.

Contributor	Education/Experience	Contribution
Michael Barry Wilderness/Trails Salt Lake Ranger District and Supervisors Office	B.A. Recreation, B.A. Forestry, 24 years in the Forest Service	Roadless Evaluation for Wilderness, Recreation and Recreation Special Uses, Wilderness Management, GIS work
***Melissa Blackwell** Planning/Resources Group Leader Supervisors Office	B.S. Biology, 25 years in the Forest Service	Planning Team Leader
Alexandra Botello Outdoor Recreation Planner Supervisors Office (now reassigned to Pacific Southwest Region)	B.S. Recreation Administration, Parks and Resource Management, 10 years with the Forest Service	Recreation, Scenery Management
***Charlie Condrat** Hydrologist Supervisors Office	B.S. Forestry, M.S. Watershed Science, 12 years experience with the Forest Service	Watershed Health
***Paul Cowley** Fisheries Biologist Supervisors Office	B.S. Fish and Wildlife Management M.S. Fisheries Management, 13 years experience with the Forest Service as a fish biologist.	Aquatic Resources
Mike Duncan Botanist Supervisors Office	B.S. Botany, 4 years experience with the Forest Service as a botanist.	Botanical Resources
Jennifer Eberlien Heritage Program Manager Supervisors Office	B.A., M.A. Anthropology, 10 years experience with the Forest Service as an	Heritage Resources

	archeologist	
Paul Flood Soil Scientist Supervisors Office	B.S. Soil Science, 23 years with Forest Service	Range, Watershed Health
***Dave Hatch** Forest Landscape Architect Supervisors Office	B.L.A. in Landscape Architecture Environmental Planning, 13 years with the Forest Service	Scenery Management, Recreation
***Julie Hubbard** Environmental Coordinator Supervisors Office	B.S. Forest Recreation, 22 years with the Forest Service	Oil and Gas Leasing Analysis, Ski Area Analysis, Planning Coordination
Kelli Green Planning/Admin. Assistant Supervisors Office	5 years with Forest Service	Mailing List Coordination, Planning Files, Public Meeting Coordinator
***Kent O'Dell** Vegetation Management Zone Leader Mt. View Ranger District	B.S. Forest Management, M.S. Forest Ecology, 23 years experience in Forest Service forest management	Vegetation Modeling, Timber Analysis
*__Wayne Padgett__ Ecologist Supervisors Office	B.S. Biology, M.S. Rangeland Ecology, 2 years staff research associate in soils, 17 years with the Forest Service	Biodiversity
***Dave Ream** Natural Resource Manager Supervisors Office	B.S. Recreation and Resource Management, 14 years with the Forest Service	Recreation, Winter Recreation
***Teresa Rhoades** GIS Coordinator Supervisors Office	B.S. Environmental Studies, minor in Geography, M.A. Geography with emphasis in GIS and Remote Sensing, 9 years with the Forest Service	GIS Specialist
***Tom Scott** Social Scientist Supervisors Office	B.A. American History, M.A. Anthropology, 25 years with the Forest Service	Social-Economics, Roadless Evaluation, Wild and Scenic Rivers, Planning Coordination
Ron Vance Outdoor Recreation Planner Logan Ranger District	B.A. Psychology, M.A. Landscape Architecture, 8 years with the Forest Service	Recreation
***Richard Williams** Wildlife Biologist Supervisors Office	B.S. Wildlife Management, 29 years with the Forest Service	Terrestrial Wildlife Resources

Other Key Contributors

The following individuals are not on the full-time staff of the Wasatch-Cache National Forest, but contributed to the forest planning effort.

Contributor	Education/Experience	Contribution
Tom Abbay Mining Geologist Intermountain Region Office	B.S. Geology, 33 years related experience, 18 years in the Forest Service in minerals	Locatable and Salable Minerals
Barry Burkhardt Regional Leasable Minerals Specialist Intermountain Region Office	B.S. Geology, 24 years in Forest Service in leasable minerals	Leasable Minerals (Oil and Gas)
Doug Muir Realty Specialist Utah Land Adjustment Zone – Forest Service	B.S. Agronomy, M.S. Soil Chemistry, 29 years with Forest Service, last 9 years in Lands	Lands and Realty
Jolie Pollet-Strohmeyer Fire Ecologist BLM - Utah State Office (former Wasatch-Cache employee)	B.A. Geography, M.S. Forest Science, 9 years experience with BLM and Forest Service	Fire Ecology, Fire Management
Julie Schaefers Economist Rocky Mountain Regional Office	B.S. Forest Recreation, M.S. Resource Economics, 11 years with Forest Service	Social and Economic Analysis
Charmaine Thompson Heritage Program Manager Uinta National Forest	B.A., M.A. Archeology 14 years with Forest Service	Heritage Resources

Leadership Team

The Wasatch-Cache National Forest Leadership Team at the time of the release of this document is provided in the following table.

Leadership Team Member	Position
Melissa Blackwell	Resources and Planning Group Leader
Rob Cruz	District Ranger – Logan Ranger District
Tim Garcia	District Ranger – Kamas Ranger District
Loren Kroenke	District Ranger – Salt Lake Ranger District
Faye Krueger	Deputy Forest Supervisor
Larry Lucas	Recreation, Wilderness, Heritage, Special Uses Group Leader
Gloria McCabe	Administrative Officer
Steve Ryberg	District Ranger – Evanston/Mt. View Ranger Districts
Kay Shurtz	Forest Engineer
Chip Sibbernsen	District Ranger – Ogden Ranger District
Jim Thomas	Fire Management Officer
Tom Tidwell	Forest Supervisor

Others

Other Forest Service employees who helped in some way with the planning process through meetings or providing technical input are listed below.

Name	Location
Bernard Asay	Evanston/Mt. View Ranger Districts
Anthony Botello	Ogden Ranger District (now reassigned to Pacific Southwest Region)
Larry Gillham	Salt Lake Ranger District
Mead Hargis	Kamas Ranger District
Tracy Hollingshead	Evanston/Mt. View Ranger Districts
Larry Johnson	Evanston/Mt. View Ranger Districts
Carol Majeske	Salt Lake Ranger District
Connie McCaughey	Logan Ranger District
James Merzenich	Pacific Northwest Region
Bob Piscopo	Salt Lake Ranger District
Devon Robinson	Supervisors Office
Evelyn Sibbernsen	Logan Ranger District
Rick Vallejos	Ogden Ranger District
Lynn Williams	Kamas Ranger District
Steve Schied	Salt Lake Ranger District
Rick Schuler	Evanston Ranger District

CHAPTER 5 - LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE FEIS WERE SENT

Federal Agencies

U.S. Department of Agriculture
National Agricultural Library
National Park Service
Natural Resource Conservation Service
USDA Animal and Plant Health Inspection Service
U.S. Forest Service
U.S. Army Corps of Engineers

U.S. Department of Interior
Office of Environmental Project Review
U.S. Fish and Wildlife Service
Bureau of Land Management

Environmental Protection Agency
Washington Office
Denver Office – Region VIII

American Indians

Skull Valley Goshutes
Northern Ute Tribe
Northwestern Band of Shoshoni

State Governments

State of Utah
Governors Office of Planning and Budget
Resource Development Coordinating Committee
Department of Natural Resources

State of Wyoming
Office of the Governor
Office of Federal Land Policy

Utah Congressional Delegation

Congressman Scott Matheson Jr.
Congressman James Hansen
Congressman Chris Cannon
Senator Orrin Hatch
Senator Robert Bennett

Wyoming Congressional Delegation

Congresswoman Barbara Cubin
Senator Craig Thomas
Senator Michael Enzi

Universities

University of Utah – Parks, Recreation, and Tourism
Utah State University – College of Natural resources
Utah State Extension

County Governments

Utah

Box Elder County Commission
Cache County Commission
Davis County Commission
Duschesne County Commission
Morgan county Commission
Rich County Commission
Salt Lake County Council
Summit County Commission
Tooele County Commission
Wasatch County Commission
Weber County Commission

Wyoming

Uinta County Commission

Others

About 1000 interested or affected individuals, businesses, and organizations received hardcopies or CD ROMS of the Final Environmental Impact Statement, revised Forest Plan or other materials related to this analysis.

REFERENCES

Andelman, S. J., et al. 2001. Scientific Standards for Conducting Viability Assessments under the Report and Recommendations of the NCEAS Working Group. National Center for Ecological Analysis and Synthesis.

Anderson, D.C., K. T. Harper, and R. C. Holmgren. 1982a. Factors Influencing Development of Cryptogamic Soil Crusts in Utah Deserts. Journal of Range Management 35(2).

Anderson, D.C., K. T. Harper, and S. R. Rushforth. 1982b. Recovery of Cryptogamic Soil Crusts from Grazing on Utah Winter Ranges. Journal of Range Management 35(3).

Anderson, L. et al. 1990. List of the Mosses of North America, North of Mexico, and A Checklist of Sphagnum in North America North of Mexico, The Bryologist, Vol. 93, No.4, Winter 1990.

Anderson, H. W., M. D. Hoover, and K. G. Reinhart. 1976. Forests and Water: Effects of Forest Management on Floods, Sedimentation, and Water Supply. Pacific Southwest Forest and Range Experimental Station. USDA Forest Service General Technical Report PSW-18/1976.

Andrews, E. D. 1980. Effective and Bankfull Discharges of Streams in the Yampa River Basin, Colorado and Wyoming. Journal of Hydrology 46:311-330.

Austen, D.J., D.L. Scarnecchia, and E.P. Bergersen. 1994. Usefulness of Structural and Condition Indices in Management of High-Mountain Stream Salmonid Populations. North American Journal of Fisheries Management 14:681-691.

BEA (Bureau of Economic Analysis). 2000. Regional Economic Information System Cd-rom, 1969-1997. [Place of publication unknown].

BEA (Bureau of Economic Analysis). 2001. Gross Domestic Product: Fourth Quarter 2000." U.S. Department of Commerce, Washington, D.C.
Available: www.bea.doc.gov/bea/newsrel/gdp400a

Beedlow, P.A., J.G. Carter, and F.J. Smith. 1980. Primula maguirei L. Wms. (Primulaceae): A Preliminary Report on the Population Biology of an Endemic Plant. Logan, Utah: Bio-Resources, Inc.

Behnke, R. J. 1992. Native Trout of Western North America. American Fisheries Society: Monograph 6. Bethesda, MD: American Fisheries Society.

Belnap, J. 1992. Potential Role of Cryptobiotic Soil Crusts in Semiarid Rangelands. In: Proceedings at the Symposium on Ecology, Management and Restoration of Intermountain Annual Rangelands, 18-22 May. Boise, ID.

Belnap, J., et al. 2001. Biological soil crusts: Ecology and Management. Technical Reference 1730-2. Denver, CO: USDI Bureau of Land Management and U.S. Geological Survey.

Belnap, J. 2002. Personal communication.

Bjornn, T. C. and D. W. Reiser. 1991. Habitat Requirements of Salmonids in Streams. American Fisheries Society Special Publication 19: 83-138.

Blahna, D. J., K. Smith, and J. Anderson. 1995. Backcountry Llama Packing: Visitor Perceptions of Acceptability and Conflict. Leisure Sciences 17(3):185-204.

Blahna, D. 2000. Personal communication.

Blaustein, A. R. and D. B. Wake. 1995. The Puzzle of Declining Amphibian Populations. Scientific American April:52-57.

Bosch, J. M. and J. D Hewlett. 1982. "A Review of Catchment Experiments to Determine the Effect of Vegetation Changes on Water Yield and Evapotranspiration.. Journal of Hydrology 55:3-23.

Brasher, J.W. 1996a. Final Report on the 1995 Sensitive Plant Survey for the Uinta and Wasatch-Cache National Forests. Salt Lake City, Utah: Wasatch-Cache National Forest. Unpublished manuscript on file.

Brasher, J.W. 1996b. A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis, Department of Botany and Range Science. Provo, UT: Brigham Young University.

Buchta, Cheryl. March 22, 2001. Census: Hispanics in Utah Doubles. Standard-Examiner, Ogden, UT.

Burkhardt, Barry. 2000. Personal communication.

Burkhardt, Barry. 2001. Notes on Reasonably Foreseeable Development Scenarios for Forest Plan Revision. Unpublished manuscript on file, Wasatch-Cache National Forest. Salt Lake City, UT.

Burroughs, E. R., Jr., and J. G. King. 1989. Reduction of Soil Erosion on Forest Roads. General Technical Report INT-264. USDA Forest Service, Intermountain Research Station.

Burt, W. H., and R. P. Grossenheider. 1976. A Field Guide to the Mammals of North America North of Mexico. Boston.

Byorth, P.A. and J.P. Magee. 1998. Competitive interactions between arctic grayling and brook trout in the Big Hole River Drainage, Montana." *Transactions of the American Fisheries Society* 127:921-931.

Caicco, S.L. 1987. Special Plant Survey Forms for Lower Selway and Lochsa Rivers Vicinity: *Mimulus clivicola* and *Cypripedium fasciculatum*. Idaho Conservation Data Center.

Campbell, J. B. 1970a. "Hibernacula of a Population of *Bufo boreas boreas* in the Colorado Front Range." Herpetologica 26: 278-282.

Campbell, J. B. 1970b. Life history of *Bufo boreas boreas* on the Colorado Front Range. In: Dissertation Abstracts 33:3331B.

Canterbury, G., et al. 2000. Bird Communities and Habitat as Ecological Indicators of Forest Condition in Regional Monitoring. Conservation Biology 14(2):544-558.

Carlton, J. 2000. Letter from D.C. "Jasper" Carlton of the Biodiversity Legal Foundation to Jamie Rappaport Clark Director of the U.S. Fish and Wildlife Service.

CEQ (Council on Environmental Quality). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Executive Office of the President, Washington, DC: Government Printing Office.

Chidsey, T. C. 1999. Petroleum Plays in Summit County, Utah. Utah Geological Association Publication 27.

Christner, J. and R. D. Harr. 1982. Peak Stream Flows from the Transient Snow Zone, Western Cascades, Oregon. Proceedings, 50th Western Snow Conference. Fort Collins: Colorado State University Press.

Christy, H. A. and J. S. Harpel. 1997. Rare Bryophytes of the Interior Columbia River Basin and Northern Great Basin, U.S.A. Journal of the Hattori Botanical Laboratory 82: 61-75.

Clapier, K.B. 1997. Botanical Survey and Inventory Record Wasatch-Cache National Forest. Unpublished manuscript on file. Salt Lake City, Utah.

Clapier, K.B. and K. Nichols. 1997. TES Plant Field Data Reports. *Dodecatheon dentatum* var. *utahense*. Unpublished manuscript on file at Wasatch-Cache National Forest. Salt Lake City, Utah.

Clark, R. N., and D. R. Gibbons. 1991. Recreation. American Fisheries Society Special Publication 19: 459-482.

Clark, W. R. 1973. Reproduction, Survival and Density of Snowshoe Hares in Northeastern Utah. Ma.S., Utah State University, Logan.

Clinton, W. J. 2000. Executive Order, Responsibilities of Federal Agencies to Protect Migratory Birds. Washington, DC: United States Government Printing Office.

Cole, David N. 1996. Wilderness Recreation Use Trends, 1965 through 1994. Research Paper INT-RP-488. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Cone, R. S. 1989. The Need to Reconsider the Use of Condition Indices in Fishery Science. Transactions of the American Fisheries Society 118:510-514.

Copeland, S., K. Savig, and J. Adhoch. 2001. Integrated Report of Optical, Aerosol, and Scene Monitoring Data, Lone Peak Wilderness – 1993-1998. USDA Forest Service and Air Resource Specialists, Inc.

Cowley, P. 1997. Fish Surveys on the Wasatch-Cache National Forest Conducted During 1997. Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, Utah [260843].

Coyner, J. 1989. Status Check on Reported Historic Populations of *Spiranthes diluvialis*. Memorandum, Salt Lake City, Utah: U.S. Fish and Wildlife Service.

Coyner, J. 1990. Report for Population Study *Spiranthes diluvialis*. Unpublished report on file at Bureau of Land Management and Red Butte Gardens. Salt Lake City: University of Utah.

CRCT Task Force. 2001. Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah and Wyoming. Fort Collins: Colorado Division of Wildlife.

Cronquist, A., et al. 1972. Intermountain flora: Vascular plants of the Intermountain West. U.S.A. Vol. I. Reprinted 1986. New York City: New York Botanical Garden.

Da Rosa, C. D. and J. S. Lyon. 1997. Golden Dreams, Poisoned Streams, How Reckless Mining Pollutes America's Water, and How We Can Stop It. Washington, DC:Mineral Policy Center.

Debano, L. F. and J. S. Krammes. 1966. Water Repellent Soils and their Relation to Wildfire Temperatures. Bulletin International Association of Scientific Hydrology 11: 14-19.

DeGraaf, R. M., et al. 1991. Forest and Rangeland Birds of the United States, Natural History and Habitat Use. Agricultural Handbook 688. USDA Forest Service.

De Staso III, J. and F.J. Rahel. 1994. "Influence of Water Temperature on Interactions Between Juvenile Colorado River Cutthroat Trout and Brook Trout in a Laboratory Stream." Transactions of the American Fisheries Society 123:289-297.

Dissmeyer, George E. 2000. Drinking Water from Forests and Grasslands, A Synthesis of the Scientific Literature. Technical Report SRS-39. USDA Forest Service, Southern Research Station, General.

Dominick, D. S. and M. P. O'Neill. 1998. Effects of Flow Augmentation on Stream Channel Morphology and Riparian Vegetation: Upper Arkansas River Basin, Colorado. Wetlands 18(4): 591-607.

Dorward, S. 1990. Design for Mountain Communities: A Landscape Architectural Guide, Van Nostrand Reinhold, New York, New York.

Duff, D.A. 1996. Bonneville cutthroat trout (Oncorhynchus clarki utah). *In*: Conservation Assessment for Inland Cutthroat Trout, Distribution, Status and Habitat Management Implications. Duff, D.A., editor. Washington, DC: United States Department of Agriculture.

Dunkle, S. W. 2000. Dragonflies Through Binoculars. Oxford University Press.

Dunne, J. 1989. Cryptogamic Soil Crusts in Arid Ecosystems. Rangelands 11(4).

Durgin, P. B. 1985. Burning Changes the Erodibility of Forest Soils. Journal of Soil and Water Conservation May-June.

Eldridge, D.J. 1993. Cryptogram Cover and Soil Surface Condition: Effects on Hydrology on a Semiarid Woodland Soil. Arid Soil Research and Rehabilitation. Vol. 7: 203-207.

EU (Envision Utah). 2000. Envision Utah Quality Growth Strategy and Technical Review. Manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

Farrar, D. R. 2002. Personal communication.

Federal Register. 2000. Part III, Department of Agriculture, Forest Service, 36 CFR Parts 217 and 219, National Forest System Land Resource Management Planning, Final Rule. Washington, DC: Government Printing Office.

FERC (Federal Energy Regulatory Commission). 1999. Draft Environmental Assessment for Hydropower License, Stairs Hydroelectric Project, FERC Project No. 597-003, Utah. Washington, DC: Federal Energy Regulatory Commission.

FERC (Federal Energy Regulatory Commission). 2000. Final Environmental Assessment for Hydropower License, Pioneer Hydroelectric Project, FERC Project No. 2722-008, Utah. Washington, DC: Federal Energy Regulatory Commission.

Fisher, A.L., D.E. Blahna and R.Bahr. 2001. "Off Highway Vehicle Uses and Owner Preferences in Utah", Revised Final Report. Department of Forest Resources, Utah State University, Logan, UT and Utah Division of Natural Resources, Department of Parks and Recreation.

Flowers, S. 1945. "Utah Hepatics." The Bryologist. 48:8-11.

Franklin, M.A. 1989. Report for 1988 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis. Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Franklin, M.A. 1990a. Report for 1989 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Erigeron cronquistii, Musineon lineare, and Penstemon cyanthus var. compactus. Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program..

Franklin, M.A. 1990b. Report for 1990 Challenge Cost Share project, Ashley National Forest. Target species: Cypripedium fasciculatum Kellogg ex Wats. (Clustered lady's-slipper). Salt Lake City: Utah Natural Heritage Program, Department of Natural Resources.

Franklin, M.A. 1990c. Report for 1989 Challenge Cost Share Project: Wasatch-Cache National Forest. Target Species: Primula maguirei (Maguire Primrose). Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Franklin, M.A. 1991. Report for 1990 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis. Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

FSH 2209.21. Forest Service Handbook. Rangeland Ecosystem Analysis and Management Handbook, Section 2209.01.05 – Definitions. Wasatch-Cache National Forest, Salt Lake City, UT.

FSH 2609.25. R-4 Sensitive Plant Program Handbook. Forest Service Handbook. Wasatch-Cache National Forest, Salt Lake City, Utah.

FSM 1905. Forest Service Manual 1900 – Planning, Section 1905 – Definitions. Wasatch-Cache National Forest. Salt Lake City, UT.

FSM 2230. Forest Service Manual 2300 – Term Grazing Permit Administration, Section 2330. Wasatch-Cache National Forest. Salt Lake City, UT.

FSM 2521. Forest Service Manual 2521 – Watershed Condition Assessment. Wasatch-Cache National Forest. Salt Lake City, UT.

FSM 2360. Forest Service Manual 2360. Special Interest Areas. Wasatch-Cache National Forest. Salt Lake City, UT.

FSM 2670. Forest Service Manual 2670. Threatened, Endangered, and Sensitive Plants and Animals. Available: http://www.fs.fed.us/im/directives/fsm/2600/2670-2671.txt

FSM 2372. Forest Service Manual 2372. Special Areas. Wasatch-Cache National Forest. Salt Lake City, UT.

FSM 4063. Forest Service Manual 4063. Research Natural Areas. Wasatch-Cache National Forest. Salt Lake City, UT.

Furniss, M. J., T. D. Roelofs, and C. S. Yee. 1991. "Road construction and maintenance." American Fisheries Society Special Publication 19: 297-324.

Gifford, G. 1975. "Beneficial and Detrimental Effects of Range Improvement Practices on Runoff and Erosion." Paper presented in Proceedings, Watershed Management Symposium. American Society of Civil Engineers, Logan, UT.

Glisson, B. 1995a. Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest. Industrial Health Incorporated. Salt Lake City, Utah.

Glisson, B. 1995b. DRAFT Conservation Strategy and Action Plan for *Thelesperma pubescens* (Uinta Greenthread). IHC Environmental. Salt Lake City, Utah.

Gneiting, D. J., and R. Albert. 1999. Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report. Utah Department of Agriculture and Food, Salt Lake City, UT.

Graham, R. T., et al. 1999. Northern Goshawk in Utah: Habitat Assessment and Management Recommendations. General Technical Report RMRS-GTR-22. Fort Collins, CO.

Harr, R. D., et al. 1975. Changes in Storm Hydrographs after Road Building and Clear-cutting in the Oregon Coast Range. Water Resources Research 11: 436-444.

Harty, K. M. 1991. Landslide Map of Utah.. Map 133. Utah Geological and Mineral Survey, Utah Department of Natural Resources.

Hauge, C. J., M. J. Furniss and F. D. Euphrat. 1979. "Soil Erosion in California's Coast Forest District." California Geology (June):120-129.

Hay, Keith G. 1958. Beaver Census Methods in the Rocky Mountain Region. Journal of Wildlife Management. Vol. 22, No. 4, October 1958.

Helvey, J. D. 1980. Effects of a North Central Washington Wildfire on Runoff and Sediment Production. Water Resources Bulletin 16(4):627-634.

Hibbert, A. R. 1967. Forest Treatment Effects on Water Yield. In: *Forest Hydrology* edited by W. E. Sopper and H. W. Lull. Proceedings, Forest Hydrology Seminar. New York: Pergamon Press.

Holecheck, J.L. 1988. An Approach for Setting the Stocking Rate. Rangelands 10:10-14.

Holecheck, J.L., et al. 2001. Range Management, Principles and Practices. Fourth Edition. Prentice Hall, Upper Saddle River, New Jersey

Hollis, M. 1988. Inventory and Monitoring of Thelesperma pubescens on the Wasatch National Forest and the Rock Springs District of the Bureau of Land Management. Wyoming Natural Diversity Database, Rocky Mountain Heritage Task Force, and the Nature Conservancy.

Holmgren, N. H. 1992. Two New Species of Viola (Violaceae) from the Intermountain West, USA. *Brittonia* 44(3):300-305.

Holmgren, N. H. 1994. Redefinition of *Dodecatheon dentatum* (Primulaceae) and Rational for Varietal Rank. *Brittonia* 46(2): 87-94.

Hovingh, P. 2000. Personal communication.

Hunter, M.L. 1990. Wildlife, Forests, and Forestry, Principles of managing forests for biological Diversity. Prentice Hall, Engelwood Cliffs, NJ.

Integration of Air Quality Management into Land Management Planning, pg 1-4.

Isaacson, A. E. 2000. "Utah Economy Grows at Slower Pace in 1999." *Utah Economic and Business Review*. Vol. 60, Nos. 7 and 8.

Jarvis, T. 1999. Personal communication. Letter from Todd Jarvis, Montgomery Watson Director of Groundwater Resources, to Melissa Blackwell, Wasatch-Cache National Forest planner, regarding Oakley City Sole Source Aquifer Designation Petition.

Jennings, W.F. 1990. Personal communication. Letter to J.L. England, Botanist, U.S. Fish and Wildlife Service. Salt Lake City, Utah.

Jones, J. A., and G. E. Grant. 1996. "Peak Flow Responses to Clear-cutting and Roads in Small and Large Basins, Western Cascades, Oregon." *Water Resources Research* 32(4): 959-974.

Kaldenbach, T. 1990. Oil and Gas Potential Report. Unpublished manuscript on file at the Wasatch-Cache National Forest, Utah and Wyoming.

Kaltenecker, J. and M. Wicklow-Howard. 1994. Microbiotic soil crusts in sagebrush habitats of southern Idaho. Prepared for Eastside Ecosystem Management Project, Boise State University, Boise, Id.

Kelly, Alison. 2000. Collections Manager, Intermountain Herbarium. Personal communication.

Kimball J, Savage F. 1977. Diamond Fork aquatic and range habitat improvements. Provo, UT: USDA Forest Service Intermountain Region, Uinta National Forest. p 19.

Koch, E. D. et al. 1997. Summary of the Conference on Declining and Sensitive Amphibians in the Rocky Mountains and Pacific Northwest. Boise, Idaho November 7-8, 1996.

Krebs, C. J., et al. 2001. "Estimating Snowshoe Hare Popluation Density from Pellet Plots: A Further Evalution." Candadian Journal of Zoology 79:1-4.

Kruckeberg, A.R. and D. Rabinowitz. 1985. "Biological Aspects of Endemism in Higher Plants." *Annual Review of Ecology and Systematics*. Vol. 16 pp.447-479.

Ladyman, J.A.R. and E. Muldavin. 1996. *Terrestrial Cryptogams of Pinyon-Juniper Woodlands in the Southwestern United States: A Review*. General Technical Report. TM-GTR-280. PP.2-7. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.

Lagler, K.F. 1956. *Freshwater Fishery Biology*. Dubuque, IA:Wm. C. Brown Company Publishers.

Lentsch, L. Y. et al. 1995. *Native Fish, Amphibians, and Reptiles of Utah*. Salt Lake City: Utah Department of Natural Resources, Division of Wildlife Resources.

Lentsch, L., Y. Converse, and J. Perkins. 1997a. *Conservation Agreement and Strategy for Bonneville Cutthroat Trout (Oncorhynchus clarki utah) in the State of Utah*. Salt Lake City: Utah Department of Natural Resources, Division of Wildlife Resources.

Lentsch, L., Y. Converse, and J. Perkins. 1997b. *Conservation Agreement and Strategy for Colorado Cutthroat Trout (Oncorhynchus clarki pleuriticus) in the State of Utah*. Salt Lake City: Utah Department of Natural Resources, Division of Wildlife Resources.

Lentsch, L.D., et al. 2000. Range-Wide Conservation Agreement andStrategy for Bonneville Cutthroat Trout *(Oncorhynchus clarki Utah)*. Utah Division of Wildlife Resources, Salt Lake City, Utah.

LeVere, W. and G. Heaton. 1994. Personal communication. Letter to All Appellants for the North Slope Leasing Decision.

Lewis, M. E. 1970. Alpine Rangelands of the Uinta Mountains. Unpublished manuscript on file at USDA Forest Service, Intermountain Region (Region 4).

Liddle, M. 1975. A Selective Review of the Ecological Effects of Human Trampling on Natural Ecosystems. Biological Conservation. Vol.6,pp.17-36.

Liddle, M. 1991. Recreation Ecology: Effects of Trampling on Plants and Corals. Trends in Ecology and Evolution. Vol. 6, No. 1. January. pp.13-17.

Malm, W. and M. Pitchford. 1994. Newsletter titled "Visibility Protection". Interagency Monitoring of Protected Visual Environments, August 1994. For more Information Contact: Dr. William Malm, NPS-AIR at Colorado State University Fort Collins CO or Marc Pitchford, Environmental Monitoring Systems Lab, Las Vegas, NV.

Mangel, Marc, Lee M. Talbot, Gary K. Meffe, M. Tundi Agardy, Dayton L. Alverson, Jay Barlow, Daniel B. Botkin, Gerardo Budowski, Tim Clark, Justin Cooke, Ross H. Crozier, Paul K. Dayton, Danny L. Elder, Charles W. Fowler, Silvio Funtowicz, Jarl Giske, Rober J. Hofman, Sidney J. Holt, Stephen R. Kellert, Lee A. Kimball, Donald Ludgwig, Kjartan Magnusson, Ben S. Malayang, III, Charles Mann, Elliott A. Norse, Simon P. Northridge, William F. Perrin, Charles Perrings, Elliott A. Norse, Simon P. Northridge, William F. Perrin, Charles Perrings, Randall M. Peterman, George B. Rabb, Henry A. Regier, John E. Reynolds, III, Kenneth Sherman, Michael P. Sissenwine, Time D. Smith, Anthony Starfield, Robert J. Taylor, Michael F. Tillman, Catherine Toft, John R. Twiss, Jr, James Wilen, Truman P. Young. 1996. Principles for the Conservation of Wild Living Resources**.** Ecological Applications: Vol. 6, No. 2, pp. 338–362.

May, B. 2000. Personal communication.

McCoy, N. H et al. 2000. "DRAFT REPORT An Economic and Social Assessment of Snowmobiling in Utah". Report prepared for Utah Division of Parks and Recreation, Salt Lake City, UT.

McElhany, P., et al. 2000. "Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units." National Marine Fisheries Service. Northwest Fisheries Science Center.

McKelvey, K.S., et al. 1999. National Lynx Detection Protocol. Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

McKelvey, K. S., et al. 2000. "Lynx Conservation in an Ecosystem Management Context." In *Ecology and Conservation of Lynx in the United States*, edited by Ruggiero, L. F., et al. Boulder: University Press of Colorado.

McKelvey, K. S., et al. 2002. "Effect of Plot Size and Shape on Pellet Density Estimates for Snowshoe Hares." *Wildlife Society Bulletin* 30(3):751-755.

McNab, W. H.; and P. E. Avers. 1994. "Ecological Subregions of the United States: Section Descriptions". Administrative Publication WO-WSA-5. Washington, D.C.: USDA Forest Service, Ecosystem Management.

Meadows, D. W., C. M. Meadows, and M. Morin. 2000. *Conservation Assessment for the Ogden Rocky Mountain Snail*. Ogden, UT: Weber State University.

Megahan, W. F. 1972. "Subsurface Flow Interception by a Logging Road in Mountains of Central Idaho. In *Proceedings, Watersheds in Transition Symposium, American Water*

Resources Association, edited by S. C. Csallany, T. G. McGlaughlin and W. D. Striffler. Urbana, Illinois.

Merrill, G.I. 1995. "Bryophytes, our Living Resources: a Report to the Nation on Distribution, Abundance and Health of U.S. Plants, Animals, and Ecosystems." Washington, DC: U.S. Department of the Interior, National Biological Service.

Minnesota IMPLAN Group (MIG). 2000. IMPLAN Professional Version 2.0. Social Accounting and Impact Analysis Software. Minnesota IMPLAN Group, Inc. Stillwater, MN.

Monsell, T. 1998. *Logan Canyon Climbs*. River Heights, UT: Primrose Publication and Design.

Morris, S. E. and T. A. Moses. 1987. "Forest Fire and the Natural Soil Erosion Regime in the Colorado Front Range." *Annals of the Association of American Geographers* 77(2).

Moyle, P.B. and J.J. Cech, Jr. 1988. *Fishes: an Introduction to Ichthyology*. Englewood Cliffs, NJ.

Muth, R. M. and K. Fairey. 1995. "Managing Social Conflict in Outdoor Recreation Settings: Implications for Curriculum Development in Human Dimensions of Leisure." *Trends* 32(4): 4-8.

Muths, E., S. Corn, and S. Haire. 2000. "Examining an Intact 'Metapopulation' of Boreal Toads (*Bufo boreas*): Use of Habitat and Large Scale Movements." U.S.Geological Survey, Fort Collins, CO. Available: http://www.mesc.usgs.gov/projects/boreal_toad_movements_habitat.html

Murphy, M.B. 1996. The Development of Brighton Resort. Available: http://historytogo.utah.gov/brighton_.html

National Archives and Records Administration. 2000. *Federal Register*, Vol. 63, No. 218, Washington, DC: Government Printing Office.

Nature Conservancy. 1999. "Species Management Abstract: Northern Goshawk (*Accipiter gentilis*)." Arlington, VA.

Nelson, D. 1994. Subsections of Ten National Forests in the Intermountain Region.

Newberry, C. C. and L. L. St. Clair. 1991a. "Additions to the Lichen Flora of Utah." *The Bryologist* 94(2): 154-156.

Newberry, C. 1991b. Lichens of the Uinta Mountains and adjacent intermountain North America. Master of Science thesis, Brigham Young University, Provo. 237 pp.

Newberry, C.C. 1994. Lichens of the High Uintas Wilderness.

Niccolucci, M. 2000. FEAST (Forest Economic Analysis Spreadsheet Tool). A Microsoft Excel based workbook and instructions for data entry and tabular output for economic impact analysis (IMPLAN).

Nichols, K. 1995. TES Plant Field Data Reports. *Jamesia americana* var. macrocalyx. Uinta and Wasatch-Cache National Forests. Unpublished manuscript on file at Wasatch-Cache National Forests, Salt Lake City, Utah.

O'Brien, R.A. and R. Pope. 1997. Forest Resources of the Wasatch-Cache National Forest. United States Department of Agriculture, Forest Service. Intermountain Research Station.

Olson, R. and W. Hubert. 1994. *Beaver: Water Resources and Riparian Habitat Manager*. Laramie: University of Wyoming.

Padgett, W.G. 1986. "Maguire Primrose Summary Report." Logan: Utah Native Plant Society.

Padgett, W.G. 1990. "Hydrothermograph Report for the Wood Camp Population of Maguire Primrose (*Primula maguirei* L. Williams); Logan Ranger District, Wasatch_Cache National Forest." Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

Padgett, W.G. 1997. "TES Plant Field Data Reports. *Draba maguirei* var. maguirei. Woodcamp Survey." Unpublished manuscript on file at Wasatch-Cache National Forest. Salt Lake City, UT.

Padgett, W.G. 1998. "TES Plant Field Data Reports. *Erigeron cronquistii*." Unpublished manuscript on file at Wasatch-Cache National Forest. Salt Lake City, UT.

Padgett, W.G. 2000. Personal Communication.

Palis, J., et al. 1999. *Species Management Abstract, Northern Goshawk*. Arlington, VA: The Nature Conservancy.

Peterson, R. T. 1990. *A Field Guide to Western Birds*. Boston, MA: Houghton Mifflin Company.

Phillips, R. W., et al. 1975. "Some Effects of Gravel Mixtures on Emergence of Coho Salmon and Steelhead Trout Fry." *Transactions of the American Fisheries Society* 104:461-466.

Pierson, K. and V.J. Tepedino. 2000. "The Pollination and Reproduction of *Spiranthes diluvialis*: Implications for Conservation of Four Populations." USDA Forest Service Challenge Cost Share Program. Uinta National Forest. Provo, Utah and USDI Fish and Wildlife Service. Salt Lake City, Utah.

Platts, W. S. 1991. "Livestock Grazing." *American Fisheries Society Special Publication* 19: 389-424.

Primack, Richard B. 1993. *Essentials of Conservation Biology*. Sunderland, MA: Sinauer Associates, Inc.

Rahr III, G. R., et al. 1998. "Sanctuaries for Native Salmon: A Conservation Strategy for the 21st Century." *Fisheries* 23(4): 6-7.

Reid, L. M. and T. Dunne. 1984. "Sediment Production from Forest Road Surfaces." *Water Resources Research* 20: 1753-1761.

Richards, John. 1993. Primula. Timber Press, Inc. Portland, OR.

Rideout, D. R., and H. Hesseln. 2000. "Wyoming Timber Market Analysis: The New Western Timber Economy". Administrative study for USDA Forest Service. Colorado State University, Fort Collins, CO.

Roby, K. B., D. C. Erman, and J. D. Newbold. 1977. "Biological Assessment of Timber Management Activity Impacts and Buffer Strip Effectiveness on National Forest Streams in Northern California." *Earth Resources Monograph* 11. Washington, DC: U.S. Department of Agriculture.

Ruediger, B., et al. 2000. *Canada Lynx Conservation Assessment and Strategy*. Forest Service Publication #R1-00-53. Missoula, MT: USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service.

Ruggiero, L. F., et al. 2000. *Ecology and Conservation of Lynx in the United States*. Boulder: University Press of Colorado.

Salt Lake, City of. 1999. Salt Lake City Watershed Management Plan, November 1999. Salt Lake City, Department of Public Utilities. Prepared by Bear West Consulting Team.

Sheviak, C.J. 1984. "*Spiranthes diluvialis* (Orchidaceae), A New Species from the Western United States." *Brittonia* 36 (1):8-14.

Sheviak, C.J. 1990. Personal communication. Letter to J.L. England, Botanist, U.S. Fish and Wildlife Service. Salt Lake City, Utah. The University of the State of New York. Albany, New York.

Shultz, Leila M. 1993. Patterns of Endemism in the Utah Flora. In R.Sivinski, Robert and Karen Lightfoot [eds.]. Soutwest Rare and Endangered Plants(conference proceedings). Publ. No.2 New Mexico Department of Energy. Minerals and Resources. Division of Forestry and Resource Conservation.

Sigler, W. F., and R. R. Miller. 1963. *Fishes of Utah*. Salt Lake City: Utah State Department of Fish and Game.

Sigler, W. F., and J. W. Sigler. 1987. *Fishes of the Great Basin: Natural History*. Reno: University of Nevada Press.

Sigler, W. F. and J. W. Sigler. 1996. *Fishes of Utah*. Salt Lake City: University of Utah Press.

Sipes, S.D., and V.J. Tepedino. 1995. "The Pollination and Reproduction of *Spiranthes diluvialis*: Implications for Conservation of Four Populations." Salt Lake City, UT: USDA Forest Service Challenge Cost Share Program. Uinta National Forest. Provo, Utah. USDI Fish and Wildlife Service.

Spangler, J. 1994. "Wilderness Group Supports a Colorado Cutthroat Refuge." *Deseret News*, B-1. January 29, 1994.

St. Clair, L. L, J.R. Johansen and S. B. Rushforth. 1984. "Lichens of Soil Crust Communities in the Intermountain Area of the Western United States." *Great Basin Naturalist*. Vol. 53, No. 1:5-12.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*. Boston, MA: Houghton Mifflin Company.

Steele,R. and K. Geier-Hayes. 1995. "Ecology and Silviculture of Western Larch at its Southern Limits." In *Ecology and Management of Larix Forests, A Look Ahead: Proceedings of an International Symposium. Whitefish, Montana, 1992*. General Technical Report. INT-GTR-319. pp.500-501. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

Stevens M. and W. Padgett. 1999. "*Dodecatheon dentatum* var. utahense – Uinta and Wasatch-Cache National Forests TES Plant Field Data Report." Unpublished manuscript on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

Stokes, W.I. 1988. *Geology of Utah*. Salt Lake City: Utah Museum of Natural History and Utah Geological and Mineral Survey Department of Natural Resources.

Stone, D.R. 1993. "Final Report for 1992 Challenge Cost Share Project, Uinta and Wasatch-Cache National Forests. Target Species: *Spiranthes diluvialis* Sheviak." Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Stone, D.R. 1994. "Field Inventory for Frank Smith's violet (*Viola frank-smithii* N. Holmgren) in the Logan Canyon Drainage, Cache County, Utah." Prepared for USDA Wasatch-Cache National Forest, Salt Lake City, Utah. Salt Lake City: Utah Natural Heritage Program, Division of Wildlife Resources.

Stone, D.R. 1995. "Status Review of *Draba globosa* and Related Species." Final Report for 1994 Challenge Cost Share Project. Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Stotler, R. and B. Crandall-Stotler. 1977. "A Checklist of the Liverworts and Hornworts of North America." *Bryologist*. Vol. 80:405-428.

Swanston, D. N. 1991. "Natural Processes." *American Fisheries Society Special Publication* 19.

Swanston, D. N. and F. J. Swanson. 1976. "Timber Harvesting, Mass Erosion, and Steepland Forest Geomorphology in the Pacific Northwest." In Geomorphology and Engineering, edited by D.R. Coates. Stroudsburg, PA: Dowden, Hutchinson, and Ross.

Tanner, V. M. 1931. "A Synoptical Study of Utah Amphibians." *Utah Academy of Sciences* (8):159-198.

Taye, A. C. 1983. "Flora of the Stansbury Mountains, Utah." *Great Basin Naturalist* 43:4.

Thompson, H. 2000. Personal communication.

Thompson, P. 2000. "Bonneville Cutthroat Trout (Oncorhynchus clarki utah) surveys in the Chalk Creek (Sections 02-03) Drainage, 1998-1999." Salt Lake City: Utah Division of Wildlife Resources.

Tilman, D. 2000. Causes, consequences and ethics of biodiversity. *Nature* 405:208-211

TRCA (Theodore Roosevelt Conservation Alliance). 2000. "The Economic Values of Fishing, Hunting and Wildlife Viewing on National Forest Lands." Prepared for Wildlife, Fish and Rare Plants, USDA Forest Service. Available: http:/WWW.TREA.ORG

Troendle, C. A. and R. M. King. 1985. "The Effect of Timber Harvest on the Fool Creek Watershed, 30 Years Later." *Water Resources Research* 21(12): 1915-1922.

Tuhy, J.S. 1991. "*Aster kingii* (King Aster) and *Lesquerella garrettii* (Garrett Bladderpod) on the Uinta and Wasatch-Cache National Forests, Utah. Final Report for Challenge Cost Share Agreements with the Uinta and Wasatch-Cache National Forests." Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Tuhy, J.S. 1993. "Monitoring Study of *Lesquerella garrettii* (Garrett Bladderpod) on the Uinta and Wasatch- Cache National Forests, Utah. Final Report for Challenge Cost Share Agreements with the Uinta and Wasatch-Cache National Forests." Salt Lake City: Utah Department of Natural Resources, Utah Natural Heritage Program.

Tuhy, J.S. 1998. "Resarch Natural Area Needs on National Forest Lands in Utah." Report to Intermountain Region, Forest Service. Unpublished manuscript on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

UDWR UDNR(Utah Department of Natural Resources). 2002. Element Occurrence Database. Utah Division of Wildlife Resources. Salt Lake City.

UDWR (Utah Division of Wildlife Resources). 1995. *Native Fish, Amphibians, and Reptiles of Utah*. Publication #95-20. Salt Lake City, UT.

UDWR. 1997a. Conservation Agreement and Strategy for Bonneville Cutthroat Trout in the State of Utah. Salt Lake City, UT: UDWR.

UDWR. 1997b. Conservation Agreement and Strategy for Colorado River Cutthroat Trout (*Oncorhynchus clarki ple*uriticus) in the State of Utah. Salt Lake City, UT: UDWR.

UDWR. 1997c. Fish Stocking and Transfer Procedures W2ADM-1. Approved by John Kimball 24 September 1997.

UDWR. 1997d. Inventory of Sensitive Species and Ecosystems in Utah. Salt Lake City, UT. Prepared for the Utah Reclamation Mitigation and Conservation Commission and the U. S. Department of Interior.

UDWR. 1997e. Inventory of Sensitive Vertebrate and Invertebrate Species of Utah. Salt Lake City, UT.

UDWR. 1998a. Utah Sensitive Species List. Available: http://www.wildlife.utah.gov/sensppl.htm#mollusk.

UDWR. 1998b. Inventory of Sensitive Species and Ecosystems in Utah: Endemic and Rare Plants of Utah: An Overview of Their Distribution and Status. Central Utah Project Completion Act, Title III Section 306(b). Utah Reclamation Mitigation and Conservation Commission, Mitigation and Conservation Plan (May 1996), Chapter 2, Page 2-37, Cooperative Agreement No. UC-95-0015, Section V.A.10.a. Available: http://www.utahcdc.usu.edu/ucdc/ViewReports/plantrpt.htm

UDWR. 1998c. Utah Big Game Range Trend Studies – Volume One. Publication Number 98-16. Salt Lake City, UT.

UDWR. 1998d. Inventory of Sensitive Species in Utah – Fish, Amphibians, Reptiles, Invertebrates, Mammals, and Birds. Salt Lake City, UT. Available: http://www.utahcdc.usu.edu/ucdc.

UDWR. 1998e. Conservation Agreement for the Spotted Frog (*Rana luteiventris*). Publication Number 98-24. Salt Lake City, UT.

UDWR. 1999a. Utah Partners in Flight Avian Conservation Strategy. Publication Number 99-40. Salt Lake City, UT

UDWR. 1999b. Rare, Imperiled, and Recently Extinct or Extirpated Mollusks of Utah. Publication Number 99-29. Salt Lake City, UT.

UDWR. 2000a. The Bats of Utah – A Literature Review. Publication Number 00-14. Salt Lake City, UT. Available: http://www.utah.cdc.usus.edu/ucdc.

UDWR. 2001. 2001 Utah Big Game Proclamation. Salt Lake City, UT.

UDWR. 2002. Central Biodiversity Database Information (CD). Utah Natural Heritage Program GIS Data. Provided to Region 4 Forest Service. Salt Lake City, UT.

UNHP. 1999. Challenge Cost Share Agreement Between the Utah Division of Wildlife Resources and the USDA Forest Service, Wasatch-Cache National Forest. Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.

United States. v. Amerac Energy Corporation. 1999. 148 IBLA 45-51.

USDA Forest Service. 1981. Recreation Activity Duration Factors for Computing Activity Occasions on National Forest Lands and Waters. Washington D.C.

USDA Forest Service. 1985. Wasatch-Cache National Forest Land and Resource Management Plan. Forest Plan and Appendices. Salt Lake City, UT.

USDA Forest Service. 1986. ROS Book. Washington D.C.

USDA, Forest Service. 1989. Threatened, Endangered, and Sensitive Plant Program Action Plan. Forest Service Intermountain Region. Ogden, Utah.

USDA Forest Service. 1990a. Maguire Primrose (*Primula maguirei*) Recovery Plan. U.S. Fish and Wildlife Service. Denver, Colorado.

USDA Forest Service. 1990b. Resource Pricing and Valuation Procedures for the Recommended 1990 RPA Program. USDA Forest Service, Washington D.C.

USDA Forest Service. 1990c. The Wasatch-Cache Petroleum Showcase. Unpublished brochure on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1991. Forest and Rangeland Birds of the United States – Natural History and Habitat Use. Agricultural Handbook 688.

USDA Forest Service. 1992. Wasatch-Cache National Forest 5-Year Monitoring Report, Land and Resource Management Plan. Salt Lake City, UT: Wasatch-Cache National Forest.

USDA Forest Service. 1993. The principal laws relating to Forest Service activities. U.S. Department of Agriculture, Forest Service. Washington, D.C.

USDA Forest Service. 1994a. North Slope Oil and Gas Leasing Final Environmental Impact Statement. Wasatch-Cache National Forest. Salt Lake City, UT.

USDA Forest Service. 1994b. Intermountain Region Species List. Ogden, UT: Region 4.

USDA Forest Service. 1994c. The Scientific Basis for Conserving Forest Carnivores – American Marten, Fisher, Lynx, and Wolverine in the United States. General Technical Report RM-254. Fort Collins, CO.

USDA Forest Service. 1994d. Flammulated, Boreal, and Great Gray Owls in the United States: A Technical Conservation Assessment. General Technical Report RM-253. Fort Collins, CO.

USDA, Forest Service. 1995a. DRAFT Diamond Fork/Spanish Fork Watershed Management Plan. Resource Management International.

USDA Forest Service. 1995b. Landscape Aesthetics, A Handbook for Scenery Management. Agricultural Handbook Number 701.

USDA Forest Service. 1996. Rangeland Health Final Environmental Impact Statement. Wasatch-Cache National Forest. Salt Lake City, UT.

USDA Forest Service. 1997a. Final Environmental Impact Statement for the Alta Ski Area Master Development Plan Update. On file at Wasatch-Cache National Forest, Salt Lake City, Utah.

USDA Forest Service. 1997b. Lewis and Clark Oil and Gas Leasing Final Environmental Impact Statement. Lewis and Clark National Forest. Great Falls, Montana.

USDA Forest Service. 1998a. "Changing Economics of the National Forest Timber Sale Program." Washington, D.C. Available: www.fs.fed.us/land/fm/tspirs/changing.html.

USDA Forest Service. 1998b. Intermountain Region Protocol: Rangeland Capability and Suitability Determinations for Forest Plan Revisions. Intermountain Region Office. Ogden, UT.

USDA Forest Service. 1998c. Sub-regional Assessment of Proper Functioning Conditions for Areas Encompassing the National Forests of Northern Utah. Unpublished manuscript on file at Wasatch-Cache National Forest. Salt Lake City: UT.

USDA Forest Service. 1998d. Deer Herd Unit Management Plans. Unpublished manuscripts on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1998e. Elk Herd Unit Management Plan. Unpublished manuscripts on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1999a. Preliminary Analysis of the Management Situation (PAMS). Wasatch-Cache National Forest. Salt Lake City, UT.

USDA Forest Service. 1999b. Sustaining the People's Lands – Recommendations for Stewardship of the National Forests and Grasslands into the Next Century – Committee of Scientists. Washington, D.C.

USDA Forest Service. 1999c. Inventory of Rivers on Wasatch-Cache National Forest, Eligible for Inclusion in the National Wild and Scenic Rivers System. Intermountain Region. On file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1999d. Final Environmental Impact Statement for the Brighton Ski Area Master Development Plan Update. On file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1999e. Final Environmental Impact Statement for the Snowbird Master Development Plan. On file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 1999f. Intermountain Region (R4), Regional Forester's Sensitive Species List Revision. Ogden, Utah.

USDA Forest Service. 2000a. The Recreation Agenda. FS-691. USDA Forest Service. Washington, DC.

USDA Forest Service. 2000b. Water for the National Forests and Grasslands, Instream Flow Protection Strategies for the 21st Century. Watershed and Air Management. Washington, D.C.

USDA Forest Service. 2000c. Utah Fire Amendment Predecision Environmental Assessment. Intermountain Region. Ogden, UT.

USDA Forest Service. 2000d. Letter from Mike Dombeck, Chief to all Regions. Payments to States, Public Law 106-393, Washington, D.C.

USDA Forest Service. 2000e. The Fire Effects Information System [Data base]. Missoula, MT: Intermountain Research Station, Intermountain Fire Sciences Laboratory. Magnetic tape reels; 9 track; 1600 bpi, ASCII with Common LISP present.

USDA Forest Service. 2000f. Southwest Idaho Eco-group Forest Plan DEIS, Technical Report #3: 4-6. Intermountain Region Office. Ogden, UT.

USDA Forest Service. 2000g. USDA Forest Service Strategic Plan. FS-682. Washington, D.C.

USDA Forest Service. 2000h. White Paper on Managing for Viable Populations – Draft 10-9-2000. Unpublished manuscript on file at Wasatch-Cache National Forest. Salt Lake City, UT.

USDA Forest Service. 2000i. Utah Northern Goshawk Project Decision Notice: Finding of No Significant Impact, Finding of Non-Significant Amendment. Manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 2000j. Water and the Forest Service. Washington Office, FS-660.

USDA Forest Service. 2000k. Protecting People and Sustaining Natural Resources in Fire-Adapted Ecosystems: A Cohesive Strategy. Available: http://fs.fed.us/publications/cohesive_strategy10132000.pdf

USDA Forest Service. 2001a. Payments to the state regional database. Intermountain Region, Ogden, UT.

USDA Forest Service. 2001b. White Paper on Managing For Species Viability. Draft 01/26/01. Regions 1 and 4.

USDA Forest Service. 2001c. White paper discussing 25% Fund data for Forest Service. Report on file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 2001d. "American Indian Tribes in Utah", USDA-FS unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDA Forest Service. 2001e. Appeal decision of the Rio Grande National Forest Land and Resource Management Plan, Colorado Environmental Coalition, et al. (# 97-13-00-0057).

USDA Forest Service. 2001f. "The Build Environment Image Guide for the National Forests and Grasslands". FS-710. USDA Forest Service, Washington, D.C.

USDA Forest Service. 2001g. Ski Area BMPs (Best Management Practices), Guidelines for Planning, Erosion Control and Reclamation. Prepared by the USDA Forest Service Wasatch-Cache National Forest in cooperation with Sun Valley Corporation and Snowbasin Ski Area. Intermountain Region, Wasatch-Cache National Forest, Salt Lake City, Utah.

USDA Forest Service. 2001h. Solitude Mountain Resort, Final Environmental Impact Statement, Solitude Mountain Resort Master Development Plan Update, Wasatch-Cache National Forest, Salt Lake City, Utah.

USDA Forest Service. 2001i. Utah Fire Amendment Decision Notice/FONSI Environmental Assessment. Intermountain Region. Ogden, UT.

USDA Forest Service. 2002a. Forest Insect and Disease Conditions in the United States 2000. Forest Health Protection Program. Available: http://www.fs.fed.us/foresthealth/annual_i_d_conditions/index.

USDA Forest Service. 2002b. Quick-Silver. Internal software program for economic analysis of long-term, on-the-ground resource management projects.

USDA Forest Service. 2002c. Forest Insect and Disease Conditions in the United States 2000. Forest Health Protection.
Available: www.fs.fed.us/foresthealth/annual_i_d_conditions/index.html

USDA Forest Service. 2002d. "Drought Conditions and Conservation Measures, with Enclosure A, National Forest Water Yield Augmentation- Limited Opportunities Due to Operational Realities." Memorandum from the Intermountain Region to Forest Supervisors. On file at Wasatch-Cache National Forest, Salt Lake City, Utah.

USDA Forest Service. 2002e. Wasatch Front Fuels Assessment Report. On file at Wasatch-Cache and Uinta National Forests. Salt Lake City, Utah.

USDA Forest Service. 2002f. White Paper on Managing For Species Viability. Draft 07/02. Regions 1 and 4.

USDA, USDI. 2001. A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment, 10-Year Comprehensive Strategy. Available: http://www.fireplan.gov/10_yr_strat_pg_1.html.

USDA, USDI 2002. DRAFT Burke's draba (*Draba burkei* sp.nov.) Conservation Assessment and Strategy. U.S. Forest Service, Intermountain Region, Wasatch-Cache National Forest, U.S. Fish and Wildlife Service. Salt Lake City, Utah.

U.S. Department of Agriculture. 1998. Land Areas of the National Forest System. Forest Service FS-383. Washington, DC

USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center

U.S. Department of Commerce, Bureau of the Census. 1990a. 1990 Census of Population, Social and Economic Characteristics of Utah. Washington, DC Available: http://factfinder.census.gov/.

U.S. Department of Commerce, Bureau of the Census. 1990b. 1990 census of population, social and economic characteristics of Wyoming. Washington, DC. Available: http://www.factfinder.census.gov.

U.S. Department of Commerce, Bureau of the Census. 2000. Statistical abstract of the United States: 1999. Washington, DC.

U.S. Department of Commerce, Regional Economic Information System (REIS). 2002a. Data available on U.S. Department of Commerce and linked websites: http://www.commerce.gov.

U.S. Department of Commerce. U. S. Census Bureau. 2002b. American Fact Finder Website, 2002. Available: http://www.census.gov.

U.S. Department of Interior. 1997. 1996 National Survey of Fishing, Hunting and Wildlife Associated Recreation. U.S. Fish and Wildlife Service and U.S. Department of Commerce, Bureau of Census. Washington, DC: U.S. Government Printing Office.

US EPA 2000. National Air Quality and Emissions Trend Report, 1998. US Environmental Protection Agency, EPA 454/R-00-003. Washington, DC.

USDI (US Department of Interior). 1996a. "1995 National Assessment of United States Oil and Gas Resources." U.S. Geological Survey, Digital Data Series 30, 35 and 36.

USDI National Park Service. 1993. Visual Quality of Built Environments in National Parks.

USDI National Park Service. 2000. Winter Use Plans Final Environmental Impact Statement Volume I, for the Yellowstone and Grand Teton National Parks and John D. Rockefeller Memorial Parkway. On file at Wasatch-National Forest, Salt Lake City, Utah.

USDI USDA. 1982. "National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility and Management of River Areas." *Federal Register* 47(173):39454-59.

USDI USFWS (US Fish and Wildlife Service). 1985. Endangered and Threatened Wildlife and Plants: Final Rule to Determine *Primula maguirei* (Maguires Primrose) to be a Threatened Species. Federal Register 50:33731-33737.

USDI USFWS. 1986. Maguire Primrose (Primula maguirei) Recovery Plan. Region 6, US Fish and Wildlife Service. Denver, Colorado.

USDI USFWS. 1973. Endangered Species Act. Available: http://endangered.fws.gov/esa.html

USDI USFWS. 1990. Maguire Primrose (*Primula maguirei*) Recovery Plan. Denver, CO.

USDI USFWS. 1992. Endangered and Threatened Wildlife and Plants: Final Rule to list the plant *Spiranthes diluvialis* (Ute ladies'tresses) as a Threatened Species. Federal Register 57(12): 2048- 2054.

USDI USFWS. 1995a. DRAFT Ute ladies'-tresses (*Spiranthes diluvialis*) recovery plan. U.S. Fish and Wildlife Service. Denver, Colorado.

USDI USFWS. 1995b. Recommendations and Guidelines for Ute Ladies'-tresses Orchid (*Spiranthes diluvialis*) Recovery and Fulfilling Section 7 Consultation Responsibilities. U.S. Fish and Wildlife Service, Utah Field Office. Salt Lake City, Utah.

USDI USFWS. 1999a. June Sucker (*Chasmistes liorus*) Recovery Plan. Denver, CO.

USDI USFWS. 1999b. Utah Field Office Guidelines for Raptor Protection from Human Land Use Disturbances. Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDI USFWS. 2001. Endangered, Threatened, Proposed and Candidate Species, Wasatch-Cache National Forest. Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

USDI USFWS. 2002a. Endangered and Threatened Wildlife and Plants: Petition for a Candidate Species: *Botrychium lineare*. Federal Register 67(114): 40671.

USDI USFWS. 2002b. Federally Listed and Proposed (P) Endangered (E) and Threatened (T) Species and Habitat in Utah by County. Salt Lake City, UT.

USDI USFWS and US Bureau of Census. 1997. 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. Washington, DC.: Government Printing Office.

USFWS (U.S. Fish and Wildlife Service). (n.d.) Notice of Availability of the Draft Conservation Strategy for the Southern Rocky Mountain Population of the Boreal Toad for Review and Comment Background summary: Available: http://www.xmission.com/~gastown/herpmed/boreal.htm

USFWS (U.S. Fish and Wildlife Service). 2000. Draft Status Review of Bonneville Cutthroat Trout. Salt Lake City, UT.

USGS Biological Survey. 2000. Species Accounts from internet on breeding bird surveys conducted in and near the Uinta NF. Available: http://www.pwrc.nbs.gov.

Utah State Library. 1997. State Fish, Cutthroat Trout: Available: http://pioneer.lib.ut.us/trout.html.

Utah, State of. 1997a. Utah State Water Plan Weber River Basin. Utah Division of Water Resources, Utah Department of Natural Resources.

Utah, State of. 1997b. Utah State Water Plan Jordan River Basin. Utah Division of Water Resources, Utah Department of Natural Resources.

Utah, State of. 1997c. Utah State Water Plan Utah Lake Basin. Utah Division of Water Resources, Utah Department of Natural Resources.

Utah, State of. 1998a. QGET (Quality Growth Efficiency Tools) Databook. Demographic and Economic Analysis, Governors Office of Planning and Budget, State of Utah, Salt Lake City. Available: http://www.governor.state.ut.us/dea/qget.

Utah, State of. 1998b. Utah Skier Visit Analysis, Governor Office of Planning and Budget. On file at Wasatch-Cache National Forest, Salt Lake City, UT.

Utah, State of. 2000a. Standards of Quality for Waters of the State. R317-2, Utah Administrative Code. Effective Date of Last Revision – March 17, 2000. Utah Department of Environmental Quality, Division of Water Quality.

Utah, State of. 2000b. Utah's Year 2000 303(d) List of Waters. Department of Environmental Quality, Division of Water Quality.

Utah, State of. 2000c. Final Utah Smoke Management Plan. Utah Division of Air Quality, Utah Airshed Group. July 20, 1999, revised.

Utah, State of. 2000d. Map of State of Utah National Ambient Air Quality Standards, Areas of Non-Attainment and Maintenance on Utah Department of Environmental Quality. Available: http://www.deq.state.ut.us/eqair/graphics/maps/pcnonatt.gif.

Utah, State of. 2000e. "Economic Report to the Governor." Governor's Office of Planning and Budget.

Utah, State Of. 2001a. "Oil and Gas Production Reports." Division of Oil and Gas Mining.

Utah, State of. 2001b. :Economic Report to the Governor." Governor's Office of Planning and Budget, State of Utah, Salt Lake City.

Utah, State of. 2001c. Utah State Water Plan West Desert Basin. State of Utah, Natural Resources, Division of Water Resources.

Utah, State of. 2001d. Utah's Water Resources, Planning for the Future, May 2001, Utah State Water Plan. State of Utah, Natural Resources, Division of Water Resources.

Utah, State of. 2002a. Utah's 2002 303(d) List of Waters, April 2002. Department of Environmental Quality, Division of Water Quality.

Utah, State of. 2002b. Bear River Basin, Planning for the Future, Advisory Review Draft, July, 2002, Utah State Water Plan. State of Utah, Natural Resources, Division of Water Resources.

Utah Rare Plant Workshop Meeting Results. 2000. Utah Department of Natural Resources. Natural Heritage Program. Salt Lake City, Utah.

Utah Native Plant Society. 2000. Notes from discussion at Utah Rare Plant Workshop Meeting In Salt Lake City, Utah.

Vekasy. M., et al. 2001. Fall 2000 Raptor Migration Study in the Wellsville Mountains of Northern Utah. Unpublished manuscript on filet, Wasatch-Cache National Forest, Salt Lake City, UT.

Wallentine, K.J. 1993. TES Plant Field Data Reports with cover letter. *Cypripedium fasciculatum*. Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

WCNF (Wasatch-Cache National Forest). 1982. Water Analysis of Management Situation for Forest Planning. Unpublished Manuscript on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

WCNF (Wasatch-Cache National Forest). 1998. Sub-Regional Assessment of Properly Functioning Conditions for Areas Encompassing the National Forests of Northern Utah.Version 1.0. Unpublished manuscript on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

WCNF (Wasatch-Cache National Forest). 1999. Inventory of Rivers on the Wasatch-Cache National Forest Eligible for Inclusion in the National Wild and Scenic Rivers System. Unpublished manuscript on file at the Wasatch-Cache National Forest, Salt Lake City, UT.

Welsh, S.L. 1987. "Logan Canyon, U.S. 89 Study, Biological Assessment of Maguire Primrose Near Wood Camp." Report to Utah Department of Transportation, Salt Lake City.

Welsh, S.L., et al. 1993. *A Utah Flora: Second Edition*, revised. Provo, UT: Brigham Young University.

Wemple, B. C., J. A. Jones, and G. E. Grant. 1996. "Channel Network Extension by Logging Roads in Two Basins, Western Cascades, Oregon." *Water Resources Bulletin* 32(6): 1195-1207.

Wikstrom Economic and Planning Consultants. 2000. "1999-2000 Utah Skier Survey. Salt Lake City. UT." Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City.

Williams, L.O. 1936. Revision of the Western Primulas. American Midland Naturalist 17:741-748.

Wilson, L. et al. 1975. *Soils of Utah*. Agricultural Experiment Station, Bulletin 492, Logan: Utah State University.

Windham, M.D. and M. Beilstein. 1998. "A Taxonomic Study of *Draba maguirei* and Allied Taxa (Brassicaceae)." Unpublished manuscript on file at Wasatch-Cache National Forest, Salt Lake City, UT.

Wolf, P.G., and R.B. Sinclair. 1997. "Highly Differentiated Populations of the Narrow Endemic Plant Maguire Primrose (*Primula maguirei*)." *Conservation Biology*; Vol. 11, no. 2 (Apr. 1997): 375-378.

Wolfe, M. L., et al. 1982. "Snowshoe Hare Cover Relationships in Northern Utah." *Journal of Wildlife Management* 46:662-670.

Wolman, M. G. and R. P. Miller. 1960. "Magnitude and Frequency of Forces in Geomorphic Processes." *Journal of Geology* 68: 54-74.

Wyoming Game and Fish. 2001. Bird Prioritization. Cheyenne, WY.

Wyoming Species of Special Concern. 2001. Wyoming Natural Diversity Database. Available: http://uwadmnweb.uwyo.edu/wyndd/WYNDD/SpeciesofConcern.

Wyoming, State of. 2000. "Green River Basin Summary. Water Quality summary at Wyoming Department of Environment." Available: http://deq.state.wy.us/wqd/305b/green.htm.

Wyoming, State of. 2001a. "Production Statistics." Wyoming Oil and Gas Commission. Available: http://wogcc.state.wy.us/

Wyoming, State of. 2001b. Bear River Basin Water Plan, Executive Summary. September, 2001. Prepared for the Wyoming Water Development Commission. Available: http://waterplan.state.wy.us/plan/bear/execsumm.html

Wyoming, State of. 2001c. Executive Summary, Green River Basin Water Plan. February, 2001. Prepared for the Wyoming Water Development Commission Basin Planning Program. Available: http://waterplan.state.wy.us/basins/green/green.html

Wyoming, State of. 2002. Wyoming's 2002 303(d) List of Waters Requiring TMDLs. Department of Environmental Quality, Wyoming. Available: http://deq.state.wy.us/

Young, M. K., et al. 1996. "Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*)." In Conservation Assessment for Inland Cutthroat Trout, Distribution, Status and Habitat Management Implications, edited by D. A. Duff. Washington, DC: United States Department of Agriculture.

GLOSSARY AND ACRONYMS

Sources for this glossary include: Forest Ecosystem Management: An Ecological, Economic, and Social Assessment; Report of the Forest Ecosystem Management Assessment Team (FEMAT); 1993; Region 4 Revision Desk Guide; Resource Planning Act Program Glossary 1995; and U.S.D.A. Forest Service Manual & Handbook, Executive Order 11987(Exotic Organisms); USDA Forest Service, People's Glossary of Ecosystem Management Terms (http://www.fs.fed.us/land/emterms.html)

GLOSSARY

100-year flood
A flood event of such magnitude it occurs, on average, every 100 years (this equates to a one percent probability of occurring in any given year).

abiotic
Non-living material such as climate, rocks, and soil particles.

active nest
In regards to goshawk habitat, a goshawk nest known to have contained an egg. A nest need not have successfully produced fledglings (Utah Northern Goshawk Project Environmental Assessment, October 1999).

access rights. A privilege or right of a person or entity to pass over or use another person's or entity's travel way. (36 CFR 212.1, FSM 5460.5 - Rights of Way Acquisition, FSM 7700 - Transportation System)

active nest
In regards to goshawk habitat, a goshawk nest known to have contained an egg. A nest need not have successfully produced fledglings (Utah Northern Goshawk Project Environmental Assessment, October 1999).

activity area
A land area impacted by a management activity, excluding specified transportation facilities, dedicated trails, and mining excavations and dumps. Activity areas include harvest units within timber sales, prescibed burn areas, and grazing areas within allotments. Riparian and other environmentally sensitive areas may be monitored and evaluated as individual activity areas within larger management areas.

adaptive management
A type of natural resource management in which decisions are made as part of an on-going process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society.

age class
An interval into which the age of species is divided for classification. An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

air pollutant
Any substance in air that could, if in high enough concentration, harm humans, animals, vegetation, or material. Air pollutants may include almost any natural or artificial matter capable of being airborne, in the form of solid particles, liquid droplets, gases, or a combination of these.

air quality
The composition of air with respect to quantities of pollution therein; used most frequently in connection with "standards" of maximum acceptable pollutant concentrations.

airshed
A geographical area that shares the same air mass due to climate, physical and natural features, and atmospheric conditions.

allelopathy
The release of chemical substance by one plant that inhibits the growth of another plant.

allotment (grazing)
Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

Allotment Management Plan (AMP)
A document prepared in consultation with the permittees(s) involved that specifies the program of action for implementation of the forest plan as related to livestock grazing activities. Each allotment on National Forest System lands is required to have an Allotment Management Plan. Each plan must be reviewed and updated every 10 years or if conditions deem necessary, whichever comes first.

Allowable Sale Quantity (ASQ)
The quantity of timber on a forest that may be sold from a designated area for a specified time period. ASQ is determined in the Forest Plan.

alluvial
Silt, sand, gravel, or similar materials transported and deposited by running water.

alternate nest area
In regards to goshawk habitat, goshawk *home ranges* often contain two or more nest areas, only one of which will be active in a give year. Alternate nest areas are normally historical nest areas (Utah Northern Goshawk Project Environmental Assessment, October 1999).

alternative
In an Environmental Impact Statement (EIS), one of a number of possible options for responding to the purpose and need for action.

amenity
Resource use, object, feature, quality, or experience that is pleasing to the mind or senses; typically refers to values for which monetary values are not or cannot be established, such as scenic or wilderness values.

Animal Unit Month (AUM)
The amount of *forage* required by a one thousand (1,000) pound cow, or its equivalent, for one month.

annual maintenance
Work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

Appropriate Management Response
Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy
A plan or direction selected through a decision process to guide wildland fire management actions to meet protection and fire use objectives. The planned strategy for suppression action in terms of kind, amount, and timing on a wildland fire that most efficiently meets fire management direction under current and expected burning conditions.

aquatic ecosystem
40 CFR 230.3 - Waters of the United States that serve as habitat for interrelated and interacting communities and populations of plants and animals. FSM 2526.05 - The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur therein.

aquifer
A body of rock that is saturated with water or transmits water. When people drill wells, they tap water contained within an aquifer.

arterial road.
A forest road that provides service to large land areas and usually connects with other arterial roads or public highways. (FSH 7709.54 - Forest Transportation Terminology Handbook, no longer in print)

aspect
The direction a slope faces. A hillside facing east has an eastern aspect.

ASQ (Allowable Sale Quantity)
On a National Forest, the quantity of timber that my be sold from a designated area covered by the forest plan for a specified time period.

attainment area
A geographic area in compliance with the National Ambient Air Quality Standards. An area may be an attainment area for one pollutant and a nonattainment area for others. See also *nonattainment area*.

attitudes, beliefs, and values
FSH 1909.17 Preferences, expectations and opinions people have for forests and the management and use of particular areas. Differing values and expectations have resulted in polarized perceptions that a healthy environment requires protection of lands from human influence, or increased attention to environmental quality presents a threat to employment, economy or lifestyle.

AUM (Animal Unit Month)
The amount of forage required by a one-thousand (1,000) pound cow, or the equivalent, for one month.

background
The area located 4 miles to horizon from the observer.

bark beetle
An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs. Bark beetles are important killers of forest trees.

basal area
The area of the cross section of a tree trunk near its base, usually 4 and 1/2 feet above the ground. Basal area is a way to measure how much of a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.

base water flows
That part of the streamflow derived from groundwater or sources such as lakes and *wetlands*. Base flows do not include direct runoff from precipitation or melting snow.

baseline
The first set of data collected at an established monitoring site, to be compared with subsequent monitoring data from the same location.

beneficial use
An actual or potential use that may be made of the waters of the state that is protected against quality degradation. Examples of beneficial uses include domestic, agricultural, and industrial water supplies, recreation, aquatic life, aesthetics, wildlife habitat, and salmon spawning.

Best Management Practice (BMP)
A practice or combinaton of practices, that is determined by a State after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals (40 CFR 130.2(q)).
Best Mangement Practices as defined by State of Utah-Division of Water Quality regulation or agreement between the State of Utah and Forest Service include the following (appendix A):

- State of Utah Non Point Source Management Plan for Silvicultural Activitie.s
- State of Utah Non Point Source Management Plan for Hydrologic Modifications.
- Salt Lake County Water Quality and Pollution Control: Erosion and Sediment Control Handbook.

big game
Large mammals, such as deer, elk, and antelope that are hunted for sport.

biological control
The use of natural means to control unwanted pests. Examples include introduced or naturally occurring predators such as wasps, or hormones that inhibit the reproduction of pests. Biological controls can sometimes be alternatives to mechanical or chemical means.

biological diversity (or biodiversity)
The variety and abundance of life and it's processes. It includes all living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Biological diversity also refers to the compositions, structures, and functions of species and habitats and their interactions.

biomass
The total weight of all living organisms in a biological community.

biophysical components
Refers to biological and/or physical components in an ecosystem.

biota
Living material.

biotic
Living parts of an *ecosystem* such as plants and animals.

blowdown
Trees felled or broken off by wind.

board foot
A measurement of wood equivalent to a board one foot square and one inch thick. Usually expressed in terms of thousand board feet (MBF) or million board feet (MMBF).

broadcast burning
Burning forest fuels as they are, with no piling or windrowing.

browse
Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as elk and deer.

candidate species
Plant and animal species being considered for listing as endangered or threatened, in the opinion of the U.S. Fish & Wildlife (FWS) or the National Marine Fisheries Service (NMFS). Category 1 candidate species are groups for which the FWS or NMFS has sufficient information to support listing proposals; category 2 candidate species are those for which available information indicates a possible problem but need further study to determine the need for listing.

canopy
The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be use to describe lower layers in a multi-storied forest.

capability
The potential of an area of land to produce resources, supply *goods and services*, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

capital improvement
The construction, installation, or assembly of a new fixed asset, or the significant alteration, expansion, or extension of an existing fixed asset to accommodate a change of purpose. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

carrying capacity
The maximum number of people a site can accommodate at any given time, usually measured in PAOTs (*People At One Time*).

categorical exclusion
A category of acts which do not individually or cumulatively have significant effect on the human environment.

cave
Any naturally formed void, cavity, recess, or system of interconnected passages that occur beneath the surface of the earth or within a cliff or ledge, including natural subsurface water and drainage systems, that is large enough to permit a person to enter, whether or not the entrance is naturally formed or human-made. The term “cave” also includes any natural pit, sinkhole, or other feature that is an extension or component of a cave. See also *significant*.

cave life
All life forms, including plants and vertebrate or invertebrate animals, endemic (indigenous) to *caves* or that commonly use *caves* during the completion of their life cycles.

cavity
A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

cfs (cubic feet per second)
A unit of measurement in cubic feet of the amount of water flowing in an area.

chaining
The act of dragging of a heavy chain between two vehicles to reduce or clear shrubs or saplings from an area.

characteristic
Qualities that constitute a character, that characterize a landscape; a distinguishing trait, feature, or quality; uniqueness; attribute.

chemical control
The use of pesticides and herbicides to control pests and undesirable plant species.

classified road
See *road*.

Clean Air Act
An Act of Congress established to protect and enhance the quality of the Nation's air through air pollution prevention and control.

Clean Water Act
An Act of Congress which establishes policy to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

clearcut
A harvest method removing all trees in a *stand* in one cutting.

climax
The culminating stage in plant succession for a given site. Climax vegetation is stable, self-maintaining, and self-reproducing.

coarse filter management
Land management that addresses the needs of all associated species, communities, environments, and ecological processes in a land area. (See *fine filter management*.)

Code of Federal Regulations (CFR)
The general and permanent rules published in the Federal Register by the Executive departments and agencies of the federal government.

collaborative stewardship
We will care for the land and serve people by listening to all our constituents and by living within the limits of the land...commitment to healthy ecosystems and working with people on the land.

collector road
A forest road that serves smaller land areas than an arterial road. Usually connects forest arterial roads to local forest roads or terminal. (FSH 7709.54 - Forest Transportation Terminology Handbook, no longer in print)

commodity outputs
Tangible material products which are produced from raw materials obtained on the national forest. Commodity outputs are measured in various established units (cubic feet of timber, barrels of oil, etc.), and bought and sold in the market. Includes timber products, oil, natural gas, minerals, and forage for livestock.

components of ecosystem management
Biological diversity, physical diversity, social diversity, and economic diversity are the four components of Southwest Idaho Ecosystem Management Framework.

composition
What an ecosystem is composed of. Composition could include water, minerals, trees, snags, wildlife, soil, microorganisms, and certain plant species,

composition (species)
The species that make up a plant or animal community, and their relative abundance.

concentrated use area
Concentrated Use Area (CUA) is where the Forest Service invest management time or dollars for the management of sites or areas of recreation activity that leave evident impacts, such as litter, vandalism, or soil compaction. Any constructed features or management activities are primaryily for resource protection rather than user convenience. The primary management objective is to protect and stabilize natural resources.

concern level
Is a measure of the degree of public importance placed on how landscapes are viewed from travelways and use areas.

conifer
A tree that produces cones, such as a pine, spruce, or fir tree.

connectivity
The degree to which similar but separated vegetation components of a landscape are connected.

conservation agreement
A formal written agreement for implementing the conservation strategy. It describes specific actions and responsibilities of the participating agrencies.

conservation biology
A discipline whose goal is "to develop scientific and technical means for the protection, maintenance, and restoration of life on this planet – its species, its ecological and evolutionary processes, and its particular and total environment." (Society for Conservation Biology, 2000)

conservation strategy
A written document describing specific actions required to reduce or eliminate threats to candidate species or species of special concern and to assure their long-term survival.

Continuous Assessment and Planning (CAP)
An approach to planning that allows for ongoing adjustments to incorporate new technology and scientific knowledge.

Controlled Surface Use (CSU)
See *mining stipulations*.

cord
A stack of wood 4 x 4 x 8 ft, or 128 ft^3 (1.2 x 1.2 x 2.4m, or 3.6 m^3).

corridor (landscape)
Landscape elements that connect similar patchers of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

cover type
Stands of a particular vegetation type that are composed of similar species. The aspen cover type contains plants distinct from the pinyon-juniper cover type.

criteria air pollutants
Pollutants that are common to sites across the U.S. and for which *air quality* criteria have been established: ozone, a principal component of smog; *Volatile Organic Carbon* (VOC), smog-forming chemicals released from the combustion of fossil fuels, solvents, paints, glues, and plastics; carbon monoxide (CO), from automobile emissions, burning of gasoline, natural gas, coal, etc.; nitrogen dioxide, from burning of gasoline, natural gas, coal, automobile emissions; *Particulate Matter* (*PM10, PM2.5*), includes dust, smoke and soot from the burning of wood, diesel fuel, dust from unpaved *roads*, agricultural burning, etc.; sulfur dioxide, from the burning of coal and oil; lead, from leaded gasoline, metal smelters and the manufacture of lead batteries.

critical habitat
Areas designated for the survival and recovery of federally listed threatened or endangered species.

crown height
The distance from the ground to the base of the crown of a tree.

cultural element
Attributes in a human-altered landscape; scenically positive cultural elements, most of which have historical backgrounds or nostalgic connotations. Examples include split-rail fences, stone walls, barns, orchards, hedgerows, and cabins.

cultural landscape
Human-altered landscapes, especially those slowly evolving landscapes with scenic vegetation patterns or scenic structures. Addition of these elements creates a visually pleasing complement to the natural character of a landscape.

cultural resource
The remains of sites, structures, or objects used by people in the past; this can be historical or pre-historic.

cumulative effects
Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

cut and fill slope
An area of land where soil from the hillslope is removed and placed elsewhere to form a base for a given activity, usually the construction of a road (i.e., convex slopes are excavated and concave slopes are filled).

CWD (coarse woody debris)
Pieces of woody material having a diameter of at least three inches and a length greater than three feet (also referred to as large woody debris, or LWD).

dbh (diameter at breast height)
The diameter of a tree 4 and 1/2 feet above the ground on the uphill side of the tree.

decadent
Marked by decay or decline.

decommissioning
Various levels of treatment to stabilize and rehabilitate unneeded roads or trails, such as blocking the entrance, revegetating, water barring, removing fills and culverts, reestablishing drainage ways, removing unstable road shoulders, or full obliteration by recontouring and restoring natural slopes.

deferred maintenance
Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or noncritical at any point in time. Continued deferral of noncritical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, ADA, OSHA, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

demographic
Related to the vital statistics of human populations (size, density, growth, distribution...)

designated dispersed site
An area used as a campsite or recreation site that includes a hardened, barren area. Sites are hardened to encourage use in those areas, and reduce use in more fragile areas.

design vehicle.
The vehicle frequently using the road that determines the minimum standard for a particular design element. No single vehicle controls the standards for all the design elements for a road. Determine the maximum and minimum standards from the type and configuration of the vehicles using the road. Analyze each design element to determine which vehicle governs the standard for that element. (FSH 7709.56, Sec 4.1- Road Preconstruction Handbook)

desired landscape character
Appearance of the landscape to be retained or created over time, recognizing that a landscape is a dynamic and constantly changing community of plants and animals. This is a combination of landscape design attributes and opportunities, as well as biological opportunities and constraints.

developed recreation
Primary management objective is to provide enhancement of recreation opportunities through site modification and providing various amenities. Example ski resorts, campgrounds, etc..

deviation
Departure from described landscape character or from landscape character goals. Deviation from described landscape character can be positive, negative, or have no effect.

DFC (Desired Future Condition)
A portrayal of the land, resource, or social and economic conditions that are expected to result in 50-100 years if objectives are achieved. A vision of the long-term conditions of the land.

dispersed recreation
Dispersed Recreation is where undeveloped recreation activities and their associated impacts are dispersed through out the Forest. Any constructed amenities or management are for resource protection rather than user convenience. Undeveloped Recreation and Concentrated Use Area are included in Dispersed Recreation.

distance zones
Landscape areas denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape attributes or the scenic effect of human activities in a landscape.

disturbance
Any event, such as wildfire or a timber sale, that alters the structure, composition, or function of an ecosystem.

disturbance regime
All known current and historical *disturbances* of a subject area.

down woody debris
Dead woody material, such as limbs and large roots, on the ground or in streams.

ecological approach
An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

ecological integrity
In general, ecological integrity refers to the degree to which the elements of biodiversity and the functions that link them together and sustain the entire system are complete and capable of performing desired functions. Exact definitions of integrity are somewhat relative and may differ depending on the type of ecosystem being described.

ecological function
The process through which the constituent living nonliving elements of ecosystems change and interact, including biogeochemical processes and succession.

ecological legacy
The ecological conditions (composition, structure, patterns, and functions) passed on from one generation to the next.

ecological processes
The actions or events that link organisms (including humans) and their environment such as disturbance, successional development, nutrient cycling, carbon sequestration, productivity, and decay.

ecological units
Classification units for environmental settings designed to be useful in identification, description, comparison, and analysis. The classifications are based on climate, topography, geology, soils, hydrology, and vgetation. The system includes different scales of units, from larger to smaller.

ecology
The interrelationships of living things to one another and to their environment, or the study of these interrelationships.

economic efficiency
Producing goods and services in areas best suited for that production based on natural biophysical advantage or an area's ability to best serve regional demands of people.

economic dependency
Dependent upon the output(s) of the forest(s).

economic region
A group of communities and their surrounding rural areas that are linked together through trade.

ecoregions
An area over which the climate is sufficiently uniform to permit development of similar ecosystems on sites that have similar properties. Ecoregions contain many landscapes with different spatial patterns of ecosystems.

ecosystem
An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

ecosystem health
A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

ecosystem management
Scientifically based land and resource management that integrates ecological capabilities with social values and economic relationships, to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term.

ecotone
The transition zone between two biotic communities, such as between the spruce-fir forest type and the mixed conifer forest, which is found at lower elevations than the spruce-fir.

ecotype
A population of a species in a given ecosystem that is adapted to a particular set of environmental conditions.

edge
The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, or a ponderosa pine stand next to an aspen stand.

eligibility (for Wild and Scenic Rivers)
A river is eligible for inclusion in the National Wild and Scenic River System if it is free-flowing and has at least one river-related value that is considered outstandingly remarkable.

endangered species
A plant or animal that is in danger of extinction throughout all or a significant portion of its range. The Secretary of the Interior in accordance with the Endangered Species Act of 1973 identifies endangered species.

endemic plant/organism- A plant or animal that occurs naturally in a certain region and whose distribution is relatively limited geographically. (see also: *indigenous, global distribution*)

enhancement
A short-term management prescription with the express purpose of increasing positive scenic attributes where few exist.

environmental analysis
A comprehensive evaluation of *alternative* actions and their predictable short- and long-term environmental effects, including physical, biological, economic, social, and environmental design factors and their interactions.

Environmental Assessment (EA)
A concise analysis of the significance of a given project's potential environmental consequences. An EA is required by the *National Environmental Policy Act* (NEPA), and determines if an *Environmental Impact Statement* (EIS) is needed.

Environmental Impact Statement (EIS)
A detailed statement of a given project's environmental consequences, including unavoidable adverse environmental effects, *alternatives* to the proposed action, the relationship between local short-term uses and long-term productivity, and any irreversible or irretrievable commitment of resources.

ephemeral
A stream or portion of a stream that flows only in direct response to precipitation, receiving little or no water from springs and no long continued supply from snow or other sources, and whose channel is at all times above the water table.

erosion
The wearing away of the land surface by wind or water.

even-aged stand
A group of trees of a single *age class*.

even-aged silvicultural system
A method to regenerate and maintain a *stand* with a single *age class* of trees.

Existing Scenic Integrity ("Existing visual condition")
Current state of the landscape, considering previous human alterations.

exotic species
All species of plants and animals not naturally occurring, either presently or historically, in any ecosystem of the United States.

fauna
The animal life of an area.

fine
Sediment of very small particle sizes, including sand, silt, and clay.

fine filter management
Management that focuses on the welfare of a single or only a few species rather than the broader habitat or ecosystem. (See *coarse filter management*.)

fire cycle
The average time between fires in a given area.

Fire Management Plan (FMP)
A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

fire regime
The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.

fire use
The combination of wildland fire use and prescribed fire application to meet resource objectives.

fish-bearing streams
Stream segments that support fish during all or a portion of a typical year.

fisheries habitat
Streams, lakes, and reservoirs that support fish, or have the potential to support fish.

flood plain
A lowland adjoining a watercourse. At a minimum, the area is subject to a 1% or greater chance of flooding in a given year.

floodplain
The land bordering a stream or river subject to overflow flooding during periods of high water level.

flora
The plant life of an area.

fluvial
Of or pertaining to a river.

focal species
categories of species used to assess ecological integrity

forage
Plant material (usually grasses, forbs, and brush) that is available for animal consumption.

foreground
Detailed landscape generally found from the observer to ½ mile away. See also *immediate foreground.*

forbs
Broadleaf ground vegetation with little or no woody material.

forest cover type
See *cover type*.

Forest Development Road (FDR)
See *National Forest System road.*

forest health
A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

forest highway
A forest road under the jurisdiction of, and maintained by, a public authority and open to public travel. (USC: Title 23, Section 101(a)).

forest road
As defined in Title 23, Section 101 of the United States Code (23 U.S.C. 101), any road wholly or partly within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and

development of its resources. (FSM 7705 - Transportation System)

Forest Service Manual (FSM)
The Forest Service Manual (FSM) contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities. See also *Forest Service Handbook (FSH)* below.

Forest Service Handbook (FSH)
The Forest Service Handbooks (FSH) are the principal source of specialized guidance and instruction for carrying out the direction issued in the *Forest Service Manual (FSM)*. Specialists and technicians are the primary audience of handbook direction. Handbooks may also incorporate external directives (such as the Federal Property Management Regulations in FSH 6409.31) with related USDA and Forest Service directive supplements. See also *Forest Service Manual (FSM)* above.

forest transportation system management. The planning, inventory, analysis, classification, record keeping, scheduling, construction, reconstruction, maintenance, decommissioning, and other operations undertaken to achieve environmentally sound, safe, cost-effective, access for use, protection, administration, and management of National Forest System lands. (FSM 7705 - Transportation System)

fragmentation
The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. Habitat can be fragmented naturally or from forest management activities.

free-flowing
A stream that exists or flows in a natural condition without impoundment, diversion, straightening, rip-rapping, or any other modification of the waterway.

functional class
The way a road services land and resource management needs, and the character of service it provides. (FSH 7709.54, Forest Transportation Terminology Handbook, no longer in print)

fuels
Plants and woody vegetation, both living and dead, that are capable of burning.

fuels management
The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control.

fuelwood
Wood cut into short lengths for burning.

function
All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.

gabion
A wire basket filled with clean rocks used as a retaining structure to stabilize a soil slope or riverbank or to provide support for a bridge.

General Forest Area (GFA)
General Forest Areas are all National Forest System Lands available for recreation use outside of Wilderness, developed sites, roads, trails, and administrative sites. GFA's contain a wide spectrum of recreation settings and opportunities and can be a logical working area, like a drainage, geographic area, Forest District, etc.

geoclimatic setting
The geology, climate (precipitation and temperature), vegetation, and geologic processes (such as landslides or debris flows) that are characteristic of a place; places with these similar characteristics are said to have the same geoclimatic setting.

geomorphic processes
Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.

geomorphology
A science that deals with land and submarine relief features, using principles of both physiography and geology.

GIS (Geographic Information System)
A computer system that stores and uses spatial (mappable) data.

global distribution
The occurrences of plant and animals over their range. Commonly refered to in terms of endemism including disjunct (seperated from the main population), local endemic (range of distribution is less than 100 square miles), regional endemic (global distribution is between 100 and 10,000 square miles), sparsely distributed (widespred but sporadic), peripheral (on the edge of its range), widespread, and circumboreal or circumpolar.

goal
A concise statement that describes a desired condition to be achieved some time in the future. It is normally expressed in broad, general terms, without any specific date for attainment.

goods and services
36 CFR 219 - The various outputs produced by forest and rangeland renewable resources. The tangible and intangible values of which are expressed in market and non-market terms.

green (sawtimber, oak, etc.)
Live vegetation.

group selection
An uneven-aged timber harvest system in which trees are harvested in small (<1 ac) groups.

ground cover
The percentage of material, other than bare ground (or pavement – rock less than ¾ inch in diameter), covering the land surface. It may include live vegetation, standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground and pavement would total 100 percent.

ground fire
A fire that burns along the forest floor and does nor affect trees with thick bark or high crowns.

ground water
The supply of fresh water under the earth's surface in an aquifer or in the soil.

group selection
A method of tree harvest in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age class groups in the forest.

guideline
The preferred or advisable course of action designed to promote the achievement of *goals* and *objectives*.

habitat
The place where a plant or animal lives and grows under natural conditions.

habitat capability
The ability of a land area or plant community to support a given species of wildlife.

habitat diversity
A number of different types of wildlife habitat within a given area.

habitat type- A way to classify land area . A habitat type can support certain climax vegetation, both tree and undergrowth species. Habitat typing can indicate the biological potential of a site.

hiding area/cover
Vegetation capable of hiding 90% of an adult elk or deer from human's view at a distance of 200 feet or less.

hierarchy
A general integrated system comprising two or more levels, the higher controlling to some extent the activities of the lower levels; a series of consecutively subordinate categories forming a system of classification.

historical range of variability (HRV)
The natural fluctuation of the components of a healthy *ecosystems* over time.
ecosystem over time. In this EIS, refers to the range of conditions and processes that are likely to have occurred prior to settlement of the project area by people of European descent (approximately the mid-1800s), which would have varied within certain limits over time.

historic mosiac
A pattern of vegetation communities as they would have been distributed at some time in the past. Historic reference conditions are based on fire history studies and records of historic uses of these lands both prior to and after the establishment of the National Forest System.

home range
In regards to goshawk habitat, the area that a goshawk habitually uses during nesting, resting, bathing, foraging, and roosting. A nesting home range contains nest areas (*active nests* and historical nests), the *Post Fledgling Area (PFA)*, and the foraging area (Utah Northern Goshawk Project Environmental Assessment, October 1999).

horizontal diversity
The distribution and abundance of different plant and animal communities or different stages of plant succession across an area of land; the greater the numbers of communities in a given area, the higher the degree of horizontal diversity.

human dimensions
Refers to social and economic components of an ecosystem.

HUC (Hydrologic Unit Codes)
A coding system developed by the U.S. Geological Service to map geographic boundaries of watersheds of various sizes.

hydrologic cycle
Also called the water cycle, this is the process of water evaporating, condensing, falling to the ground as precipitation, and returning to the ocean as run-off.

hydrology
The study of the properties, distribution, and circulation of water on the earth's surface, in the soil and rocks, and in the atmosphere.

immediate foreground
The detailed feature landscape found within the first few hundred feet of the observer, generally from the observer to 300 feet away. This distance zone is normally used in project level planning, not broad scale planning.

IMPLAN
A contraction for “IMpact analysis for PLANning,” IMPLAN is an input-output computer software *modeling* program that estimates the impacts of economic changes in states, counties, or communities.

indicators
A measure of or surrogate for the elements of ecosystem management.

indigenous (species)
A species which originally inhabitated a particular National Forest or National Grassland.

inherently rare species
A species is inherently rare if it occurs in only a limited number of locations, has low population numbers, or has both lilmited occurrences and low population numbers, and those conditions are natural characteristiics of the life history and ecology of the species and not primarily the result of human disturbance.

inholding
An area of private land within the proclaimed boundary of a national forest.

instream flow
The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to fisheries, visual quality, and recreational opportunities.

intermittent stream
A stream or portion of a stream that does not flow year-round but only when it receives base flow solely during wet periods, or receives groundwater discharge or protracted contributions from melting snow or other erratic surface and shallow subsurface sources.

introduction (speices)
The release, escape, or establishment of an exotic species intoa natural ecosystem.

jurisdiction
The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership. The authority to construct or maintain a road may be derived from fee title, an easement, or some other similar method. (FSM 7705 - Transportation System)

ladder fuels
Vegetation located below the crown level of forest trees, which can carry fire from the forest floor to tree crowns. Ladder fuels may be low-growing tree branches, shrubs, or smaller trees.

landscape
A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

landscape analysis
An evaluation of past management direction on a given landscape, and a prediction of future conditions given the current management direction.

landscape character
Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique.

Landscape Character Theme (LCT)
A broad description of land use patterns, vegetation processes or patterns, or dominant characteristics found in a landscape.

landscape setting
The context and environment in which a landscape is set; a landscape backdrop.

landtype
An intermediate level in the ecological classification system based on landform, natural vegetative communities, and soils.

landtype associations
A grouping of landtypes that are similar in general surface configuration and origin.

Lease Notices (LN)
See *leasing stipulations*.

leasing stipulations
The stipulations applied to all new leasable mineral operations.

> **Controlled Surface Use (CSU)**
> Use and occupancy are allowed but are restricted to mitigate effects on particular resources, such as requiring operations to meet a *visual quality objective*.
>
> **Lease Notices (LN)**
> This notice may be used in addition to one of the stipulations listed above to identify specific concern(s) that may impact lease operations on a given lease. Lease Notices do not involve additional restrictions or requirements.
>
> **No Lease (NL)**
> No new leases are authorized or unavailable for lease.
>
> **No Surface Occupancy (NSO)**
> Well sites, tank batteries, or similar facilities are not allowed to occupy the surface of specified lands.
>
> **Standard Lease Terms (SLT)**
> No special stipulations are applied and current environmental protection laws and the Federal Onshore Oil and Gas Leasing Reform Act orders restrict the operation.
>
> **Timing Limitations (TL)**
> Activities are restricted or prohibited during certain time periods.

lifestyle
The way people live.

Limits of Acceptable Change (LAC)
A planning framework that establishes explicit measures of the acceptable and appropriate resource and social conditions in recreation settings, and establishes the appropriate management strategies for maintaining or achieving those conditions.

litter
The freshly fallen or only slightly decomposed plant material covering the soil surface.

local road
A forest road that connects terminal facilities with forest collector, forest arterial or public highways. Usually forest local roads are single purpose transportation facilities. (FSH 7709.54 - Forest Transportation Terminology Handbook, no longer in print)

Lynx Analysis Unit (LAU)
An project analysis unit upon which direct, indirect, and cumulative effects analyses are performed. LAU boundaries remain constant to facilitate planning and allow effective monitoring of habitat changes over time. They are generally the size used by an individual lynx, about 25-50 square miles. These units were developed in conjunction with the U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources.

macroinvertebrate
An animal having no backbone or internal skeleton, large enough to be seen without magnification.

maintenance level
see *roads maintenance level*

management activity
An activity humans impose on a landscape for the purpose of managing natural resources.

management area
A land area with similar management goals and a common prescription, as described in the Forest Plan.

management prescription
“Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other *goals* and *objectives*.” 36 CFR 219.3, italics added. The categories provide a description of general direction for the management of a specific area based on the resource emphasis. Sometimes called "management area categories."

MCF (thousand cubic feet)
A cubic foot is a measurement of wood 1 x 1 x 1 ft (30.48 x 30.48 x 30.48 cm), in this case expressed in terms of a thousand cubic feet. Most measurements are now made in *CCF*, hundred cubic feet. See also *MMBF*.

metapopulation
A collection of localized populations that are geographically distinct yet are genetically interconnected through natural movement of individuals among conservation populations.

middleground
The zone between the foreground and the background in a landscape. The area located from ½ mile to 4 miles from the observer.

MIS (Management Indicator Species)
Representative species whose habitat conditions and population changes are used to assess the impacts of management activities on similar species in a particular area.

mitigation measures
Modifications of actions that (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the actions and it implementation; (3) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (5) compensate for impacts by replacing or providing substitute resources or environments.

mixed stand
A stand consisting of two or more tree species.

MMBF (million board feet)
A board foot is a measurement of wood 1 x 12 x 12 inches (2.54 x 30.5 x 30.5 cm), in this case expressed in terms of a million board feet. Most measurements are now made in *CCF*, hundred cubic feet.

model
An analytical framework based on the past behavior of numeric variables that is able to predict the future behavior of those variables. 10 CFR Part 960.2 defines a model as “a conceptual description and the associated mathematical representation of a system, subsystem, components, or condition that is used to predict changes from a baseline state as a function of internal and/or external stimuli and as a function of time and space.”

monitoring
The process of collecting information to evaluate if objectives and anticipated results of a management plan are being realized, or if implementation is proceeding as planned.

monoculture
A single variety of a particular species growing in one area.

mosaic
Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.

multiple-use
According to the Multiple-Use Sustained-Yield Act of 1960, the management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

National Forest Scenic Byway
A road on National Forest System Land that has been designated by the Chief of the Forest Service for its exceptional scenic, historic, cultural, recreational, or natural resources.

National Forest System Road
Any road under the jurisdiction of the Forest Service, including roads on the forest transportation system. National Forest System roads are not public roads, in that they are not funded through the Federal Highway Administration (FSM 7700). Previously called a Forest Development Road (FDR).

native species
All species of plants and animals naturally occurring, either presently or historically, in any ecosystem of the United States.

natural disturbance
Periodic impact or natural events such a fire, severe drought, insect or disease attack, or wind.

natural range of variability
See *range of variability*

NEPA (National Environmental Policy Act)
An abbreviation for the National Environmental Policy Act of 1969, which requires environmental analysis and public disclosure of federal actions.

niche
A situation or activity specially suited to a Forest's character or ability.

no action (alternative)
The most likely condition expected to exist if current management practices continue unchanged. The analysis of this alternative is required for federal actions under NEPA.

No Lease (NL)
See *leasing stipulations*.

nongame
Wildlife species that are not hunted for sport.

non-point source
A source of pollutants that flow into surface waters from agricultural run-off from fields, urban run-off from paved streets and parking areas, mining and forestry operations, and atmospheric deposition. See also *point source.*

nonattainment area
An area identified by an air quality regulatory agency through ambient air monitoring (and designated by the Environmental Protection Agency (EPA)) that presently exceeds the National Ambient Air Quality Standards for one or more criteria air pollutants. See also *attainment area.*

No Surface Occupancy (NSO)
See *mining stipulations.*

noxious weed
Those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof (FSM 2080).

nutrient cycling
Circulation or exchange of elements such as nitrogen and carbon between non-living and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.

objective
A concise time-specific statement of measurable planned results that move toward pre-established *goals*. An objective helps define the precise steps to be taken and the resources to be used in achieving identified *goals.*

observer position
Specific geographic position in the landscape where the viewer is located. Also known as a viewer platform.

objective maintenance level. The maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, or higher or lower than, the operational maintenance level. (FSH 7709.58, Sec12.3 - Transportation System Maintenance Handbook)

OHV (Off Highway Vehicle)
See *ORV*

old growth
"Old growth forests are ecosystems distinguished by old trees and related structural attributes; old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function." (Characteristics Of Old Growth Forests in the Intermountain Region, USDA Forest Service, Ogden Utah, 1993.)

open for public travel. The road section is available and passable by four-wheeled standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight or class of registration, except during scheduled periods, extreme weather or emergency conditions. (23 CFR 460.2(c)).

operational maintenance level. The maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns. It defines the level to which the road is currently being maintained. (FSH 7709.58, Sec 12.3 - Transportation System Maintenance Handbook)

ORV (Off-Road Vehicles),
Vehicles such as motor cycles, 4-wheel drive vehicles, and 4-wheelers.

outstandingly remarkable value
Characteristic of a river segment that is judged to be a rare, unique, or exemplary feature that is significant at a regional or natural scale. Values can be recreational, scenic, geological, historical, cultural, biological, botanical, ecological, heritage, hydrological, paleontological, scientific, or research-related.

overstory
In a forest with multiple layers of vegetation, the portion of the trees forming the uppermost (canopy) layer.

paleontological
Of or relating to past geological periods. Paleontological resources include fossils of shellfish, swamp forests, dinosaurs, and other prehistoric plants and animals.

partial retention
A visual quality objective which, in general, means man's activities may be evident but must remain subordinate to the characteristic landscape.

patch
An area of homogeneous vegetation, in structure and composition.

patch cut
A clearcut that creates small openings in a stand of trees, usually between 15 and 40 acres in size. Patch cuts are used to provide the disturbance needed to regenerate aspen.

pattern
The spatial arrangement of landscape elements (patches, corridors, matrix) that determines the function of a landscape as an ecological system.

People At One Time (PAOT)
A recreational capacity measurement term indicating the number of people who can use a facility or area at one time.

Perennial
When referring to bodies of water, perennial waters are defined as waters that are present during all seasons of a year.

PFC (Properly Functioning Condition)
Ecosystems are in PFC when they function within their historic range of variability.

planning area
The area of National Forest land covered by a Regional Guide or Forest Plan.

planning period
The National Forest Management Act of 1976 (NFMA) requires forest plans to be revised every 10-15 years. The planning period refers to the next 10-15 years on the Uinta National Forest under the management of the proposed Forest Plan until the next Forest Plan revision.

Play (oil and gas)
When referring to oil and gas resources, play is defined as a specific combination of geological features with perceived potential for oil and gas accumulation.

PNV
See *present net value*.

point source
A source of pollutants that is discernable and confined such as a pipe, ditch, channel, conduit, or tunnel. Point sources exclude agricultural discharges (see *non-point source*).

pole/sapling
The stage of forest succession in which trees are between 3 and 7 inches in diameter and are the dominant vegetation.

pole timber
Trees at least 5 inches in diameter, but smaller than the minimum size for sawtimber.

population
The people, wildlife, fish, or plants inhabiting a specific area.

positive cultural element
Human alterations that are scenically positive attributes, most of which have historical backgrounds or nostalgic connotations. Examples include split-rail fences, stone walls, barns, orchards, hedgerows, and cabins. There may be nodes, enclaves or constellations of positive cultural elements.

post and pole harvest
The harvest of trees four to nine inches in diameter, used primarily as fence posts, corral or fence rails, and teepee poles.

Post Fledgling Area (PFA)
In reference to goshawk habitat, an area of concentrated use by the goshawk family after the young leave the nest. (From the Utah Northern Goshawk Project Environmental Assessment, October 1999.)
Identify a Post-Fledgling Area (PFA) that encompasses the active, alternate, and replacement goshawk nest sites and additional habitat needed to raise fledglings. A PFA should be approximately 420 acres in size (in addition to the 180 nest area acres) when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available.

precommercial thinning
Removing some of the trees from a stand that are too small to be sold for lumber or house logs, so the remaining trees will grow faster.

present net value (PNV), also called present net worth
The measure of the economic value of a project when costs and revenues occur in different time periods. Future revenues and costs are "discounted " to the present by an interest rate that reflects the changing value of a dollar over time. The assumption is that dollars today are more valuable than dollars in the future. PNV is used to compare project alternatives that have different cost and revenue flows.

prescribed fire
Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met before ignition

prescription
A planned series of treatments designed to change the current condition to a condition that meets management goals.

properly functioning condition (PFC)
Ecosystems are in PFC when they function within their historic range of variability.

primary travelways and use areas
National and/or regionally important location largely associated with recreation and tourism use.

private road. A road under private ownership authorized by easement to a private party, or a road which provides access pursuant to a reserved or private right. (FS-643, Roads Analysis; Informing Decisions About Managing the National Forest Transportation System, August 1999.).

proposed action
The project or set of activities that a federal agency intends to implement, as defined in NEPA regulations.

public authority
A Federal, State, county, town or township, Indian tribe, municipal or other local government or instrumentality thereof, with authority to finance, build, operate or maintain toll or toll-free highway facilities. (23 CFR 460.2(b))

public Forest Service road
A National Forest System Road that is open to public travel and has been approved for inclusion into the Public Forest System Road Program.

public road
Any road or street under the jurisdiction of and maintained by a public authority and open to public travel. (23 U.S.C. 101(a), 23 CFR 460.2(a), FSM 7705 - Transportation System)

rangeland
Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

rangeland condition

> **satisfactory**. When the desired rangeland condition is being met or short-term objectives are being achieved to move the rangeland toward desired conditions; either meeting or moving toward desired conditions.
>
> **unsatisfactory**. When the desired rangeland condition is not being met and short-term objectives are not being achieved to move the rangeland toward desired conditions; not meeting or moving toward desired conditions.

range management
The art and science of planning and directing range use intended to yield the sustained maximum animal production and perpetuation of the natural resources.

range of variability (Also called the historic range of variability or natural range of variation.)
The components of healthy ecosystems fluctuate over time. The range of sustainable conditions in an ecosystem is determined by time, processes (such as fire), native species, and the land itself. For instance, ecosystems that have a 10 year fire cycle have a narrower range of variation

than ecosystems with 200-300 year fire cycle. Past management has placed some ecosystems outside their range of variability. Future management should move such ecosystems back toward their natural, sustainable range of variation.

rare
Taxa with small populations that are not at present "Threatened" or "Endangered" but are at risk. These taxa are usually localized within restricted geographical areas or habitats (e.g. narrow endemics) or are more widespread and thinly scattered (i.e. numerically rare) over a more extensive range.

rare plant communities
Plant communities that may be globally rare, or that may be common globally, but rare on the Wasatch-Cache National Forest, or portions of the Wasatch-Cache National Forest.

realignment (of a road)
See *reconstruction (of a road).*

reconstruction (of a road)
"Activity that results in improvement or realignment of an existing *classified road* as defined below:

> **road improvement**
> Activity that results in an increase of an existing road's *traffic service level*, expands its capacity, or changes its original design function.
>
> **road realignment**
> Activity that results in a new location of an existing *road* or portions of an existing *road* and treatment of the old roadway." (36 CFR 212.1)

recommended sensitive plant- Those plants that meet the criteria for the regional sensitive species list, but have not been formally placed on the list.

Record of Decision (ROD)
A public document associated with an *Environmental Impact Statement* (EIS) that identifies all *alternatives*, provides the final decision, the rationale behind that decision, and commitments to monitoring and *mitigation*.

Recreation Opportunity Spectrum (ROS)
A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes--primitive, semiprimitive non-motorized, semiprimitive motorized, roaded natural, rural, and urban.

Recreation Visitor Day (RVD)
Twelve hours of recreation use in any combination of persons and hours (one person for 12 hours, three persons for four hours, etc.).

rehabilitation
A short-term management goal used to return a landscape with existing visual impacts and deviations to a desired level of scenic quality formerly found in the characteristic landscape.

Research Natural Area (RNA)
An area in or as near a natural condition as possible that is set aside to preserve a representative sample of an ecological community, primarily for scientific and educational purposes.

resilient, resiliency
The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states of successional stages. In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Resources Planning Act (RPA)
The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of that act. The assessment is prepared every 10 years and describes the potential of the nation's forests and rangelands to provide a sustained flow of *goods and services*. The program is prepared every five years to chart the long-term course of the Forest Service's management of the national forests.

Right-of-Way (ROW)
The legal right to pass over another owner's land.

riparian (riparian ecosystem)
Land areas that are directly influenced by water. They usually have visible vegetative or physical characteristics showing this water influence. Steamsides, lake borders, or marshes are typical of riparian areas. The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

Riparian Habitat Conservation Area (RHCA)
Riparian Habitat Conservation Areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality. This designation still allows for a full range of activities but it emphasis the achievement of riparian management objectives that are identified on a site-by-site basis. These objectives should include riparian vegetation and instream habitat condition. The RHCAs, by condition, are defined below.

> **Category 1**. **FISH-BEARING STREAM**: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 300 feet slope distance (600 feet, including both sides of the stream channel).

Category 2 - PERMANENTLY FLOWING NON-FISH-BEARING STREAMS: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 150 feet slope distance (300 feet, including both sides of the stream channel)

Category 3 - PONDS, LAKES, RESERVOIRS, AND WETLANDS GREATER THAN 1 ACRE: RHCAs consist of the body of water or wetland and the area to 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake,.

Category 4 - SEASONALLY FLOWING OR INTERMITTENT STREAMS, WETLANDS LESS THAN 1 ACRE, LANDSLIDES, AND LANDSLIDE-PRONE AREAS: This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include, landslides and landslide-prone areas, 100 feet slope distance in watersheds containing Bonneville or Colorado River cutthroat trout, and 50 feet slope distance for watersheds not containing Bonneville or Colorado River cutthroat trout.

riparian zone
Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined present and influx of perennial and/or intermittent water, associated high water table, and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

riprap
Rocks, pieces of used concrete, or other material of various sizes placed firmly or loosely on river banks to prevent scouring by the river, or on slopes or road cuts to prevent erosion.

road
"A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary." (36 CFR 212.1)

classified roads
"Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including State roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service." (36 CFR 212.1)

temporary roads
"Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the forest transportation system and not necessary for long-term resource management." (36 CFR 212.1)

unclassified roads
"Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization." (36 CFR 212.1)

road maintenance levels

maintenance level 1 (road)
Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned *road* deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." *Roads* receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic but may be open and suitable for non-motorized uses.

maintenance level 2 (road)
Assigned to *roads* open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted *dispersed recreation*, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either to (1) discourage or prohibit passenger cars or (2) accept or discourage high clearance vehicles.

maintenance level 3 (road)
Assigned to *roads* open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. *Roads* in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some *roads* may be fully surfaced with either native or processed material. Appropriate traffic management strategies are either "encourage" or "accept." "Discourage" or "prohibit" strategies may be employed for certain classes of vehicles or users.

maintenance level 4 (road)
Assigned to *roads* that provide a moderated degree of user comfort and convenience at moderate travel speeds. Most *roads* are double lane and aggregate surfaced. However, some *roads* may be single lane. Some *roads* may be paved and/or dust abated. The most appropriate traffic management strategy is "encourage," however, the "prohibit" strategy may apply to specific classes of vehicles or users at certain times.

maintenance level 5 (road)
Assigned to *roads* that provide a high degree of user comfort and convenience. These *roads* are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is "encourage."

roadless area
Areas that do not have developed and maintained roads, and that are substantially natural.

Roadless Area Review and Evaluation II (RARE II)
A second review and evaluation begun in 1977 to identify roadless and *undeveloped* land in the National Forest System. It also determined which of the inventoried areas should be recommended to Congress for inclusion in the National Wilderness Preservation System, which areas should be managed for non-*wilderness* uses, and which areas required further planning before a reasonable decision could be made.

Road Management Objectives (RMO)
Defines the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria. (FSH 7709.55, Sec 33 - Transportation Planning Handbook)

road prism
The area of the ground containing the road surface and *cut and fill slope*.

ROS
See *Recreation Opportunity Spectrum*

Rosgen classification system
A geomorphic stream classification system developed by Dave Rosgen in 1985. The information from the classification system can help assess a stream channel's present stability or instability and past conditions, and predict future stream behavior.

rotation
The number of years required to establish and grow timber crops to a specified condition of maturity.

rotenone
The chemical compound $C_{23}H_{22}O_6$ used in fish poisons. It is of low toxicity to warm-blooded animals.

R.S. 2477
A provision originally part of the 1866 Mining Act that states in its entirety, "The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." In 1873, the provision was separated from the Mining Act and reenacted as Revised Statute (R.S.) 2477. In 1938, it was recodified as 43 U.S.C. Section 932. The Federal Land Policy and Management Act of 1976 repealed both the 1866 Mining Act and R.S. 2477, but all rights-of-way that existed on the date of the repeal (October 21, 1976) were preserved under 43 U.S.C. Section 1769 (Armstrong).

run-off
The portion of precipitation that flows over the land surface or in open channels.

salvage cutting
Cutting dead or damaged trees to recover economic value that would otherwise be lost.

sapling
A loose term for a young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously.

satisfactory rangeland condition
See *rangeland condition.*

sawtimber
Trees that are 9 inches in diameter at breast height or larger that can be made into lumber.

scale
Defined in this framework as the degree of resolution at which ecosystems are observed and measured. The geographic extent; for example, region, sub-regional, or landscape scale.

scenery
General appearance of a place, general appearance of a landscape, or features of a landscape.

scenery management
The art and science of arranging, planning, and designing landscape attributes relative to the appearance of places and expanses in outdoor settings.

scenic integrity
State of naturalness or, conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest.

Scenic Integrity Objective (SIO)
Objectives established in a Forest Plan that define the acceptable degrees of deviation from a landscape character.

> **very high (SIO)**
> A Scenic Integrity Objective that generally provides for ecological change only.
>
> **high (SIO)**
> In high scenic integrity areas, activities may only repeat attributes of form, line, color, and texture found in the described landscape character.
>
> **moderate (SIO)**
> A Scenic Integrity Objective refers to landscapes where the described landscape character "appears slightly altered." Noticeable deviations must remain visually subordinated to the landscape character being viewed.

low (SIO)
A Scenic Integrity Objective meaning activities must remain visually subordinate to the attributes of the described landscape character. Activities may repeat form, line, color, or texture common to the landscape character, but changes in quality of size, number, intensity, direction, pattern, and so on, must remain visually subordinate to the described landscape character.

very low (SIO)
A Scenic Integrity Objective meaning activities of vegetative and landform alterations may dominate the described landscape character but should appear as valued occurrences when viewed at background distances.

scenic quality
The essential attributes of landscape that when viewed by people, elicit psychological and physiological benefits to individuals and, therefore, the society in general.

scenic resource
Attributes, characteristics, and features of landscapes that provide varying responses from, and varying degrees of benefits to, humans.

scoping
The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

secondary travelways and use areas
Locally important locations associated with all types of use including recreation and tourism.

seen area
The total landscape area observed based upon landform screening. Seen-areas may be divided into zones of immediate foreground, foreground, middleground, and background. Some landscapes are seldom seen by the public.

seldom-seen
Areas of the landscape that are infrequently viewed by the public.

sensitive species
Plant and animal species, selected by the Regional Forester, for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, and significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Sensitive species are not covered in the Endangered Species Act.

sensitive watershed
watersheds having geologic formations are defined as watersheds having geologic formations highly prone to mass wasting and/or large flood events which pose an increased risk to people, water supplies and infrastructure, and other property located within them

selection harvest
An uneven-aged timber harvest system in which trees may be chosen singly or by criteria used to identify groups of trees to achieve a full range of size/age classes.

seral stage
The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another community that representes a further stage of succession.

shelterwood method
The cutting of most trees, leaving those shelter trees needed to produce sufficient shade to produce a new *age class* in a moderated microenvironment.

sidecasting
The moving of excess excavated material onto the downslope side of a road, trail, landing, or other structure during its construction.

silviculture
The care and tending of stands of trees to meet specific objectives.

slump
A landslide.

snag
A standing dead tree.

Soil and Water Conservation Practices (SWCP)
The set of practices which, when applied during implementation of a project, ensures that soil productivity is maintained, soil loss and water quality impacts are minimized, and water-related beneficial uses are protected. Some SWCP's are defined by Forest interdisciplinary teams or described in Forest Service Manuals (FSM) and Handbooks (FSH). These practices are included or incorporated by reference in Forest Plans as either Forest wide or management area specific standards and guidelines.

Forest wide or Management Area specific SWCP's can be found in the following references (Forest Plan – Apppendix B):

- R1/R4 Soil and Water Conservation Practices Handbook (FSH 2509.22).
- R4 Technical Guide for Erosion Prevention and Control on Timber Sale Areas (11/79)
- UDOT Temporary Erosion and Sediment Control Manual (2/99)
- Applied Storm Water Pollution Prevention for Highway Design and Construction
- R4/R5/R6 Winter Sports Guidebook (6/92).
- R4 Winter Sports Monitoring Plan, Appendix N

Other SWCP's are based upon site- specific level evaluations and are intended to supplement the Forest Plan for specific projects.

Special Interest Area (SIA)
Place with unusual scenic, historic, prehistoric, scientific, natural, or other special interest which merits special attention and management.

Species At Risk (SAR)
Federally listed endangered, threatened, candidate, and proposed species and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk include sensitive species and may include state listed species. A species-at-risk also may be selected as a focal species.

For the Wasatch-Cache Plan revision, the term "species-at-risk" includes:

-Fish and Wildlife Service endangered, threatened, candidate, proposed species.
-Regional Forester designated sensitive species.
-Wasatch-Cache National Forest recommended sensitve species, which are other species that meet the definition of sensitive, but have not been officially listed as sensitive

Also considered for inclusion as species-at-risk were species identified by:

-The Nature Conservancy as G1, G2,G3, T1, T2, and T3.
-State Natural Heritage programs as S1, and S2
-Partners in Flight species of concern.
-The Forest that do not appear on any other lists.

The SAR list is dynamic and species will be added as deemed necessary or removed as recovery occurs or new information indicates they are not at risk.

stand
A contiguous group of trees sufficiently uniform in *age class* distribution, *composition*, and *structure*, and growing on a site of sufficiently uniform quality to be a distinguishable unit.

standard
A required course of action or a level of attainment designed to promote achievement of *goals* and *objectives*.

Standard Lease Terms (SLT)
See *mining stipulations*.

stewardship harvest
Harvest being conducted primarily to help achieve desired ecological conditions and/or to attain some non-timber resource objective that requires manipulation the existing vegetation.

structure
The size and arrangement, both vertically and horizontally, of vegetation.

subordinate
Landscape features that are inferior to, or placed below, another in size, importance, brightness, and so on. Features that are secondary in visual impact or importance.

subbasin
A fourth field hydrologic unit that nests within the hierarchical system developed by the U.S. Geological Survey to describe watersheds. Typically 800,00 to 1,000,000 acres in size, a subbasin is smaller than a river basin (third field unit), and larger than a watershed (fifth field unit).

succession
The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that are favorable for the establishment of the next stage.

suitability (for Wild and Scenic Rivers)
Evaluation of eligible rivers for inclusion into the National Wild and Scenic River System by determining the best use of the river corridor and the best method to protect the outstandingly remarkable values within the river corridor.

suited land
Forest land designated in the Forest Plan to be managed for timber production on a regulated basis.

sustainability
The ability to maintain a desired condition or flow of benefits over time.

sustained-yield
According to the Multiple-Use Sustained-Yield Act of 1960, the achievement and maintenance in perpetuity of a high-level annual or regular output of the various renewable resources of the national forests without impairment of the productivity of the land.

temporary road
See *road*.

theme
The general focus or subject of variations on landscape character settings. Themes range from a naturally evolving landscape to an urban landscape.

threatened species
Designated by the U.S. Fish and Wildlife Service, a plant or animal species likely to become endangered throughout all or a specific portion of its range within the foreseeable future.

tiering
The coverage of broad, general information in *environmental impact statements*, with subsequent site-specific analyses incorporating that general information by reference.

Timber Stand Improvement (TSI)
Treatments (including thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees) to improve the *composition*, *structure*, condition, health, and growth of tree *stands*.

Timing Limitations (TL)
See *mining stipulations*.

TMDL (Total Maximum Daily Load)
TMDL is the sum of waste load allocations for point sources, non-point sources, natural background, and a margin of safety. A TMDL specifies the amount of a pollutant that needs to be reduced to meet water quality standards set by the state. TMDL is used in a process to attain water quality standards that 1) identifies water quality problems and contributing pollutant sources, 2) allocates pollution control responsibilities among sources in the watershed, and 3) provides a basis for taking actions needed to restore a water body.

travel map
A map which shows the transportation network and seasonal motorized or non-motorized access opportunities and limitations. This map is usually developed at a sacale smaller than the whole national forest, and is readily available to the public to assist in personal recreation and planning other uses.

travelway
Represent linear concentrations of public-viewing including freeways, highways, roads, railroads, trails, commercial flight paths, rivers, canals and other waterways.

unclassified road
See *road*.

undeveloped area
According to the Wilderness Act, it is an area that “generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable . . .” An area with no cultural features, however, some exceptions are listed in the Wilderness Act.

uneven-aged stand
A group of trees with three or more distinct *age classes*.

uneven-aged method
To regenerate and maintain a multi-aged *stand* by removing some trees in all *age classes*.

Undeveloped Recreation
Undeveloped Recreation is where recreation activity leaves evident impacts, and minimal management expenditure is made, such as law enforcement, which continues to allow the activity to occur.

ungulate
A hooved mammal such as a deer or elk.

unsatisfactory rangeland condition
See r*angeland condition.*

unwanted wildland fire
Any wildland fire not covered by a Fire Management Plan. This includes: all fires occurring outside approved wildland fire use areas; all non-lightning caused wildland fires; and fires occurring in wildland fire use areas that are not managed for wildland fire use.

use areas
Represent spots that receive concentrated public-viewing use. They include visitor centers, vista points, trailheads, campgrounds, picnic areas, swim beaches, marinas, resorts, ski areas, and other recreation sites. Use areas also include urban and suburban areas, towns and villages, subdivisions, parks and public and private golf courses, or public lands within or adjacent to national forests.

viable populations
A population which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area (36 CFR 219.19).

viewshed
Total visible area from a single observer position or the total visible area from multiple observer positions. Viewsheds are accumulated seen-areas from highways, trails, campgrounds, towns, cities, or other viewer locations. Examples are corridor, feature, or basin viewsheds.

visual absorption capability
A classification system used to denote relative ability of a landscape to accept human alterations without loss of character of scenic quality.

Visual Quality Objective (VQO)
A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape in the Visual Management System (VMS).

Wasatch Front
A geographic region in Utah along the base of the Wasatch Mountains, generally extending from Ogden on the north end to Nephi on the south end. More than 50 percent of the population of the state resides along the Wasatch Front, which includes the cities of Layton, Salt Lake City, West Valley City, American Fork, Orem, Provo, Spanish Fork, and Payson.

watch list plants
The Wasatch-Cache National Forest designates watch list plant species. These species do not meet the definition of Species At Risk, but their populations may be on the edge of their range, disjunct, local endemics, or regional endemics, or are rare throughout their distribution but,

through analysis, are found to be relatively unaffected by activities that occur on the Forest. These plants have stable population numbers, density, and habitat capability, and are predicted to remain stable. Should populations of these plants be negatively effected by allowed activities, a review of impacts may result in plants being recommended as Threatened, Endangered, or Sensitive.

watershed
A land area that contributes all its water to one drainage system, basin, stream, or river. Watersheds can be described at multiple scales. For example, the entire area draining to the Green River, above its confluence with the Colorado River, is a watershed. Likewise, the area draining to the Duchesne River above its confluence with the Green River is also a watershed, as is the drainage of Wolf Creek above its confluence with the West Fork of the Duchesne River. In this *DEIS* and Draft Forest Plan, "watershed" specifically refers to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th order *Hydrologic Unit Code*. See *Hydrologic Unit Code (HUC)* for more information on watershed classifications.

wetland
An area that is either permanently inundated with water or has seasonally high water tables that support vegetation requiring these conditions for growth and reproduction. See also *non-stream or -lake related wetlands* and *stream or lake related wetlands*.

wilderness
As defined by the 1964 Wilderness Act, "an area where earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of *undeveloped* federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. (16 U.S.C. 1131)"

Wilderness Areas
Areas that are without developed and maintained roads, and that are substantially natural, and that Congress has designated as part of the National Wilderness Preservation System.

wildland fire
Any nonstructural fire, other than prescribed fire, that occurs in the wildland. This includes wildland fire use and unwanted wildland fire.

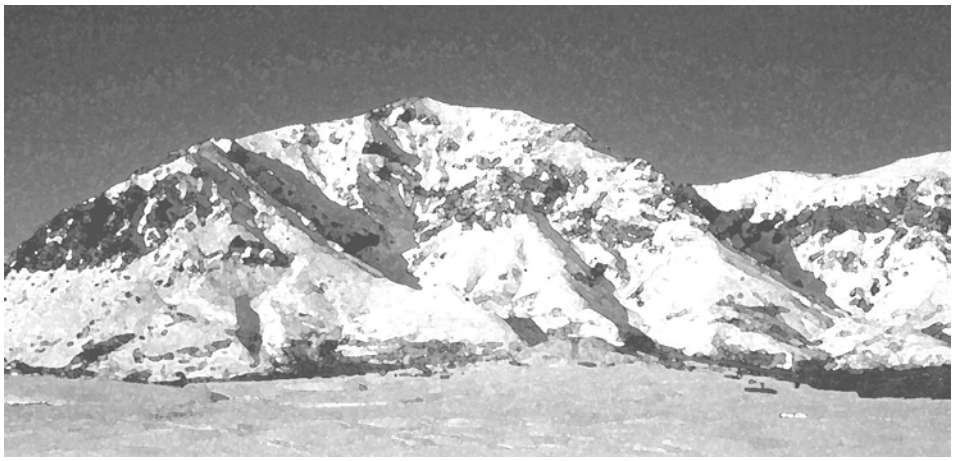
wildland fire use
The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in Fire Management Plans. Operational management is described in the Wildland Fire Implementation Plan. Wildland fire

use is not to be confused with "fire use", which is a broader term encompassing more than just wildland fires.

Wildland Fire Implementation Plan (WFIP)
A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a fire managed as wildland fire use.

wildland setting
Places which are largely undeveloped in character and generally natural appearing, especially when compared to nearby privately owned lands where more development is present (towns, cities, industrial, commerical, agricultural and modified rural landscapes.)

ZOI (Zone of Influence)
The area that is economically and socio-economically influenced by Forest Service management.



Acronyms and Symbols

ASQ	Allowable Sale Quantity
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
DEIS	Draft Environment Impact Statement
DFC	Desired Future Condition
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERU	Ecological Reporting Unit
ESA	Endangered Species Act
FACA	Federal Advisory Committee Act
FEIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographical Information System
HRV	Historical Range of Variability
HUC	Hydrologic Unit Code
IWM	Integrated Weed Management
MIS	Management Indicator Species
MMBF	Million Board Feet
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
PFC	Properly Functioning Condition
PILT	Payment in Lieu of Taxes
PVG	Potential Vegetation Group
PVT	Potential Vegetation Type
RACR	Recreation Area Conservaiton Rule
RNA	Research Natural Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RVD	Recreation Visitor Day
TES	Threatened, Endangered, and Sensitive (species)
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
WSR	Wild and Scenic River
ZOI	Zone of Influence
>	Greater than
<	Less than

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February 2003

Final Environmental Impact Statement Appendix A – Response to Comments

APPENDIX A

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APPENDIX A – PUBLIC INVOLVEMENT

Introduction

As a federal agency, we are required to solicit public comment on our draft plans involving significant actions under the National Environmental Policy Act (NEPA). Further, we are directed to "assess and consider [the resulting] comments both individually and collectively." In addition, we view such comments as critical in helping us to shape a responsible plan for management of the Wasatch-Cache National Forest that best meets the Forest Service's mission, legal mandates, the goals of NEPA and the National Forest Management Act (NFMA), and the interests of the American public as a whole.

Forest and Intermountain Region leadership and the forest plan interdisciplinary team have examined the range of public opinion on the issues and alternatives identified during the forest plan revision process. The Forest Service places high value on the reasoned and heartfelt comments that were received.

This appendix includes five sections. The first section outlines the public outreach activities and efforts made to solicit public input during the forest plan revision process. The second section is a summary of the 3,700 responses to the Draft Environmental Impact Statement (DEIS) and Proposed Forest Plan. The third section describes how we analyzed the formal public comment we received on the DEIS and Proposed Forest Plan. In the fourth section we list the public concerns and our response to them. The fifth section includes copies of all comments received on draft EIS from the Federal, State, and local agencies and elected officials.

Public Outreach

Because the land and resource management planning process determines how the lands of the National Forest System are to be managed, the public is encouraged to participate throughout the planning process. Several opportunities were presented to members of the public to gather their input and allow involvement essential to drafting these documents.

Initially, areas where the plan needed changes or updating were identified by the Planning staff, after reviewing environmental documents on file, the 1992 Monitoring Report, meetings and letters from the public, and conversations with other Forest personnel. These needs for change were formally taken to the public in April of 1999 in the Preliminary Analysis of the Management Situation (PAMS). It also included an assessment of conditions and described the new framework for a forest plan. The concept of management prescriptions was introduced as part of the framework. Throughout April and May 1999 public information forums in 11 communities were held. We heard from several hundred people through letters, e-mail messages, and conversations at open houses.

The Need for Change topics evolved into the Revision topics. Once revision topics were identified, in September of 1999 the Proposed Action for Plan Revision and Notice of Intent (NOI) for the preparation of an environmental impact statement were released for comment. Public meetings were held in four communities to explain the Proposed Action for the Forest Plan Revision. Approximately 150 people attended these meetings and some 247 comments were received.

In November and December 1999 we began to develop alternatives to rthe Proposed Action. Public workshops (8 sessions in 4 communities) were held to review issues and to engage the public in assisting with mapping of alternatives. Over 400 people attended. Opinions were diverse and the level of interest in Forest Plan Revision high. There were significant comments on snowmobiling, livestock grazing, recreation opportunities, and roadless/wilderness areas. The alternatives were developed to reflect these comments.

At key points we provided feedback to the public about our progress and comments we had heard. A Wasatch-Cache Newsletter on Plan Revision Update was mailed to 1,695 people in December 1999. Early in the new year a summary of public comments on the Proposed Action and their disposition were sent to participants.

A document explaining the five preliminary alternatives was mailed to public for comments in August of 2000. Feedback from the public helped the Planning team refine the alternatives to be analyzed in depth and the development of the preferred alternative to be displayed in the DEIS and Proposed Plan. It was crafted using some aspects of other alternatives.

In May 2001 we mailed the Proposed Forest Plan and Draft Environmental Impact Statement out to public and other agencies for review. Recognizing the complexity and detail of the planning document and maps we hosted a series of open houses in key communities. Forest leadership and the Planning Team were on hand to answer questions and gather comments.

During the summer and fall, planning team members appeared at numerous organization meetings to listen and explain the Proposed Forest Plan. In October and November we held formal oral comment hearings in key communities. We received over 200 oral comments on DEIS and Proposed Forest Plan. By the close of the comment period in November 2001, the forest had received over 3,700 formal comments on DEIS and Proposed Forest Plan. In June of 2002 a newsletter providing a general overview of these comments was mailed to nearly 5,000 recipients.

The Final EIS examines seven alternatives. Alternative 7 was formulated to deal specifically in response to comments on the draft EIS and new analysis completed after development of the release of the DEIS and Proposed Plan. Each alternative contains a theme that provides emphases for human uses and physical and biological resource management.
Members of the Forest Planning staff have coordinated with other federal agencies, the Bureau of Land Management; Fish and Wildlife Service; National Park Service; and

Natural Resources Conservation Service; and various state agencies, including the Department of Natural Resources; the Utah Division of Wildlife; and the Governor's Office of Planning and Budget. Staff also coordinated with Utah State University, U.S. Congressional representatives, county planners and county commissioners.

Beginning in May of 2000 we coordinated and consulted with Uinta County, Wyoming and Summit County, Utah who have been identified as Cooperating Agencies.

Summary of Public Comment

The following is a summary of public comment received by the Wasatch-Cache National Forest (WCNF) regarding the draft revised Land and Resource Management Plan (Forest Plan) for the WCNF and accompanying Draft Environmental Impact Statement (Draft EIS). The comment period was May 9 to November 1, 2001. The WCNF received 3,762 responses, including transcripts of oral comments from formal public meetings, letters, emails, and faxes.

The summary begins with a general overview of public comment on the Draft EIS and Forest Plan, and follows with a discussion of respondents' main areas of concern. This summary is not intended to provide an exhaustive account of public concerns. Indeed, much of the comment on the WCNF Draft EIS and Forest Plan consists of site-specific requests for management prescription category allocations and travel/recreation allocations; these site-specific comments cover so much ground (figuratively and literally) that they do not lend themselves to a brief summarization. This summary, therefore, is intended only to give a general discussion of the pervasive themes running through public comment.

General Overview of Public Comment

Public comment on the Draft EIS and Forest Plan is far-reaching, often highly detailed, and represents a wide range of values and perspectives with respect to public land management in general and management of the WCNF in particular. Given this wide range of values and perspectives only broad generalizations are possible.

In general, those who comment fall roughly into two groups: those who tend to emphasize preservation and protection of forest natural resources, and so request greater restrictions on various human uses; and those who tend to emphasize motorized access to and traditional use of forest lands, and so request either fewer or at least no additional restrictions. The distinction between these two groups is not absolute. The former group also values access and use; while the latter group also expresses concern for forest protection. Virtually everyone who comments on the Forest Plan and Draft EIS cares about the condition of the WCNF and about the value it has to users of all types. The difference is one of emphasis, and this often revolves around each group's perception of the nature and degree of impacts caused by human activities, especially recreational activities.

This difference in emphasis is reflected in the preferences people voice regarding the general management philosophy that ought to guide the WCNF. The preservation-oriented group favors ecosystem/restoration management: they stress preservation of natural processes and landscapes, ecosystem protection, and restoration of degraded areas. The use-oriented group favors multiple use management which, under their interpretation allows much more active management of forest resources, allows traditional levels of commodity extraction and grazing, and allows widespread motorized recreation (this management philosophy is referred to in the document as Traditional Multiple Use Management).

These different perspectives drive the comments people offer on virtually every topic. The single most frequently mentioned topic in public comment, however, is recreation, in particular motorized recreation. Preservation-oriented respondents frequently request that motorized recreation, both summer and winter, either be restricted or prohibited—in general, under certain conditions, or in specific areas. Use-oriented respondents frequently request that motorized recreation, both summer and winter, either be allowed or at least not be further restricted—in general, under certain conditions, or in specific areas.

Those who ask that motorized recreation be restricted appeal primarily to environmental and social considerations. According to these respondents, motorized recreation causes erosion and degrades the environment, damages watersheds, produces noise and air pollution, and disrupts wildlife. The noise and exhaust, they say, also disrupts non-motorized recreationists who go into the canyons to escape from the hustle and bustle of urban life, and to gather peace and mental rejuvenation from quiet, pristine landscapes. These respondents also say that restrictions will not negatively impact motorized users inasmuch as there are already so many areas open to them.

Those who ask that motorized recreation not be restricted argue that it does not harm the environment. While some people violate motorized boundaries and engage in behavior that is harmful to resources, they say, that is no reason to restrict all users; rather, the WCNF should rely on education and enforcement. Beyond that, these respondents appeal primarily to social and economic considerations. Many say that motorized recreation has become a much-loved family tradition, one that family members of all ages and physical abilities can enjoy. Indeed, these respondents frequently argue that motorized access is essential for the elderly and the physically impaired (a point countered by other respondents, however). Further, they maintain, motorized recreation contributes significantly to local economies.

These different views frame the significant number of site-specific requests made by the public. Respondents submit many requests regarding management prescription category allocations, travel and recreation allocations, roadless area designations and management, and wilderness recommendations and management. These numerous requests relative to specific areas, in conjunction with all other concerns raised by the public, reveal how important the WCNF is to people, and how much they care about its management and the many benefits they derive from it. Further, as allocation decisions are at the heart of the

Forest Plan, these comments and their rationales provide the planning team important feedback for use in final decisionmaking. Please consult the full summary of public concerns to review the site-specific comments as well as to examine the full range of public comment.

Overview of Comment on Specific Topics

Following is a summary of public comment on specific topics. These topics include forest plan development and planning issues, the alternatives, forest plan direction with respect to management prescription categories, and various management activities and affected resources.

Forest Plan Development and Public Involvement

Adequacy of the Document

A number of respondents make a point of saying they find the proposed Forest Plan and Draft EIS well done, clear, and immensely readable. Other respondents suggest various ways in which the WCNF should improve its documents. Suggestions include providing a more detailed table of contents or an index; producing a cross-walk document to clarify the relationship between the current and proposed Forest Plan; providing sufficient detail for site-specific travel analysis; improving the quality of its maps; and making various technical corrections.

General Adequacy of the Draft EIS Effects Analysis

A number of respondents comment that the Draft EIS cumulative effects analysis is inadequate. Others advise the WCNF to factor into its effects analysis the effects of management—including the level of development—of adjacent non-federal lands.

Relation of the Forest Plan to the Roadless Area Conservation Rule

People offer very different views regarding the possible application of the Roadless Area Conservation Rule to the WCNF forest planning process. A number of respondents advise the WCNF to protect roadless areas in a manner consistent with the Rule regardless of the Rule’s legal status. On a similar note, many say the WCNF should establish its own strong protection of roadless areas independent of national rulemaking.

Others advocate that the WCNF not manage roadless areas in accord with the Rule. Indeed, assert some, the final Forest Plan should state that it is not required to comply with the Rule, pending resolution of legal challenges, and should state that inventoried roadless areas will not be subject to any restrictions beyond the assigned management prescription category.

Forest Plan Development General

A number of respondents offer varied comments regarding the general development and adequacy of the Forest Plan. According to some, the proposed plan allows too much management flexibility. Suggestions for reducing flexibility include providing detailed descriptions of desired future conditions; more effectively integrating desired future conditions for each resource to those for management areas as a whole; more effectively linking desired future conditions to anticipated management actions; adding specific and measurable standards throughout the final Forest Plan; listing prescription-specific standards and guidelines separately from forest-wide direction; and eliminating the word "generally" from all management prescription category descriptions. Others, however, recommend increasing management flexibility—by reducing specificity in the management prescription categories, and by reevaluating management prescription categories on a district-by-district basis.

Public Involvement Efforts

One respondent commends the WCNF for "involving the public throughout the process of producing a thorough, well researched DEIS." Others suggest ways of improving its outreach efforts with the public—by expanding outreach efforts with motorized recreationists in order to improve support for travel management decisions; by holding informational planning meetings at the ski resorts in order to seek comment from out-of-staters who come here to ski; and by publishing documents and holding meetings in Spanish in order to reach the growing Hispanic population who lives along the Wasatch Front and recreates in the Tri-Canyon area. Others comment on the need to maintain a friendlier, more neutral atmosphere at public meetings, saying that inflammatory language—especially comparing environmentalists to terrorists in light of the events of September 11—is uncalled for and intimidating to other participants.

Use of Public Comment in the Decision Process

A few individuals suggest the WCNF should advise people about how to write effective comment and should make it easier to submit e-mail comments. Beyond that, most respondents who address this topic offer suggestions on how the WCNF should weigh public comment in the decision making process. Some say greater weight should be given to those who pay fees. Several say that more weight should be placed on comments from local users. Others, however, contend that federal lands are for all of our use. Some complain that many people who submit comment are ill-informed about the issues, and so greater weight should be given to detailed, scientifically-backed comments.

Some members of the public emphasize that the comment consideration process should not be turned into a vote. Others, however, advise the WCNF to canvass public opinion by, for example taking a public opinion poll or field surveying people who are actually using the land in question.

Finally, some people suggest that submission of written comment may not provide the best means of interaction between the public and decision makers inasmuch as response to individual concerns and oral comments at meetings, if it does come, comes at a much later date. One individual suggests convening less formal town meetings prior to finalizing the Forest Plan; others say the WCNF should provide specific responses to individual comments.

Involvement of Interest Groups

The perceived influence of special interest groups sparks very divided comment. Some thought in many cases powerful national environmental organizations use ‘junk’ science and are interested in only closing public lands to vehicle access and recreation. Typical comments on the other side is the charge that private and corporate interests have undue influence.

Collaboration

Respondents suggest that the WCNF should collaborate with state, county, and local governments in addressing a number of administrative/management issues—such as the size of recreational motorized tags, coordination of wildlife introductions, coordination with zoning regulations, and the use of cooperating agency status. Additionally, some advise the WCNF to better coordinate its management with that of adjacent national forests. Suggestions include working with both the Caribou and Uinta National Forests regarding wilderness recommendations; working with the Uinta National Forest to establish consistent requirements for the Snowbird ski area; and working with adjacent forests to ensure consistent management prescription categories, allocations, and travel management plans.

Alternatives

Adequacy of Alternatives

Many people reference the alternatives in their comments. Most respondents justify their preference for or against a given alternative within the context of effects on a particular resource area; hence it is in the resource sections of the document that most of these comments are found. A number of respondents do specifically assert, however, that the range of alternatives are inadequate and suggest ways that it could be broadened. Often people suggest including an alternative which emphasizes their preferred management of a particular resource—e.g., restricting motorized access, eliminating timber harvest and grazing, recommending all roadless areas as wilderness, or protecting biodiversity and ecosystem services. Some suggest the WCNF provide a balanced range of non-motorized winter recreation designations; a wider range of wilderness recommendations; and a full range of alternatives for grazing.

Additionally, a few respondents offer detailed requests for a new alternative. Some suggest a new alternative should offer a more balanced approach to resource protection,

commodity output, and recreational opportunity than any of the six alternatives under consideration.

Comparison of Alternatives

Several respondents advise the WCNF to specifically compare the effectiveness of Alternatives 1 and 6 with respect to management prescriptions, motorized recreation, winter recreation, scenic quality, and ecosystem protection. Others ask that resource outputs be provided for each alternative, and that all be compared with respect to forest health—including wildfire, insects, and disease.

Alternatives Considered in Detail

Of those respondents who specifically address the advisability of implementing a particular alternative, most address their comments to Alternatives 1, 2, 5, and 6.

Alternative 1 – Those who request that the WCNF select Alternative 1 assert that it best protects the environment, reduces motorized recreation, preserves recreational opportunities, prohibits other development, emphasizes wilderness protection, and protects habitat. Conversely, others ask that it not be selected because it promotes wilderness above other uses, restricts recreational opportunity, restricts use, and harms wildlife habitat.

Alternative 2 – Some respondents suggest the WCNF select Alternative 2 because it preserves the land, protects the environment, and has the least impact on air quality. Others say Alternative 2 should not be chosen because it restricts recreational opportunities, restricts use, harms wildlife habitat, and promotes wilderness above other uses.

Alternative 3 – A few respondents suggest the WCNF select Alternative 3 because it is well balanced, while one individual maintains that it recommends too much area for wilderness designation to be acceptable.

Alternative 4 – A few respondents suggest the WCNF select Alternative 4 because it maintains existing uses and represents a fair compromise.

Alternative 5 – Numerous respondents ask the WCNF to select Alternative 5 because it best supports diverse recreational use, as well as other traditional uses, while still providing adequate protection for the land, water, watershed, and wildlife of the forest ecosystem. They also stress that more wilderness is not needed. Others suggest that Alternative 5 should not be chosen because it allows too much off-road vehicle abuse and too much development.

Alternative 6 – Many people advise the WCNF to select Alternative 6. They felt that Alternative 6 represents compromise. Those in favor of Alternative 6 emphasize that it protects the environment, protects recreational opportunities, and preserves heli-skiing.

Other respondents oppose Alternative 6. Those who oppose it typically fall into one of two groups: one group echoes the sentiment expressed in the first part of the above quote in saying they really prefer stronger protection and restrictions; the other group opposes it because it imposes too much protection.

Suggested modifications to Alternative 6 reflect these two different perspectives. According to some, Alternative 6 should be modified to more adequately protect the environment, to protect wildlife corridors, to protect Canadian lynx habitat, and to increase the areas recommended for wilderness. Others say it should be modified to preserve motorized recreation opportunities, and to create less restrictions overall.

Forest Plan Direction

Management Prescription Categories

Some respondents offer general comments about management prescription categories—such as that the WCNF should provide a more equitable distribution of acres by management prescription categories, or should allocate acreage in inverse proportion to the degree of impact of each activity. A few ask the WCNF to clarify the distinction between certain management prescription categories, such as that between 3.1 and 3.2, or between 2.6 and 4.1. Additionally, a number of respondents ask the WCNF to assign more protective management prescription categories to all roadless acres—by utilizing Management Prescription Categories 1.5, 2.4-2.7, or 4.1.

Beyond these general considerations, many respondents make site-specific requests for management prescription category allocations. Because many of these requests are so detailed and far-ranging, they cannot be adequately summarized. Rather, a few generalizations are offered regarding the general direction of these requests. In general, most site-specific requests reflect the same emphasis on more protective management prescription categories as that found in the comments directed to roadless acres as a whole. Most site-specific requests are for Management Prescription Categories 1.5, 2.4-2.7, 3.1-3.2, and 4.1. Some request Management Prescription Category 4.5 for certain locations to allow for ski area expansion. Other comments make very specific management requests for certain areas involving multiple management prescription category allocations—some focusing on protection/restoration, and some focusing on commodity production.

Recreation Opportunity Spectrum

Many comments, which are directed specifically to Recreation Opportunity Spectrum allocations, are concerned about allocations for motorized recreation. Many request more semi-primitive motorized areas, saying the WCNF “[has] failed to adequately plan for the increase in popularity of motorized recreation in past years, let alone for the future.” Other respondents, however, maintain that semi-primitive non-motorized designations can be impacted by the noise coming from motorized designations on adjacent land. Many non-motorized recreationists assert that motorized use has exploded along with the

power of these vehicles, and request more non-motorized allocations to preserve their recreational experience and the environment. Another suggestion made by the public is that the WCNF develop four winter recreation classes:
wilderness, non-motorized, motorized, and motorized heli-ski.

Beyond these general comments, some people make site-specific requests for Recreation Opportunity Spectrum allocations. Most ask the WCNF to apply or extend semi-primitive motorized corridors to trails in certain areas, or conversely to close these areas to motorized travel.

General Environmental Values

Most general comments regarding environmental values address the advisability of ecosystem/restoration management versus traditional multiple use management.

Ecosystem/Restoration Management

Many respondents request that the WCNF preserve forest lands in their natural state and restore degraded areas. People maintain that the WCNF should not rely on intensive management to preserve forest resources, but should instead minimize human interference. Some ask the WCNF to develop a comprehensive plan for ecosystem health and species viability. Within that context, some ask the WCNF to protect and restore ecological integrity, and to aggressively restore the historic range of variability by "allowing natural disturbance regimes to operate as freely as possible within the undeveloped landscapes." Many feel that this approach best meets both human and environmental needs, especially since the Wasatch Mountains provide drinking water for many urban communities.

Traditional Multiple Use Management

Numerous people advise the WCNF to continue traditional multiple use management. They believe multiple-use management goals are the only goals that will 'best meet the needs' of the public and provide for equal program delivery to all citizens including motorized visitors. This view is echoed by most respondents who identify themselves as motorized users. People also say this approach is needed to address forest health issues and to maintain important social values. Some individuals describe family traditions centered around motorized activities in the WCNF and fear that, in the absence of traditional multiple use management, they will not be able to continue those traditions into the generations to come. A few respondents also emphasize the need to protect heritage resources and western culture which is "characterized by access to the land for multiple-uses, friendliness, good neighborliness, and sharing"—and claim that traditional multiple use management is essential to that end.

Topic 1: Watershed Health Management

Respondents often express concern over the effects of various agents on water quality—such as nitro aromatic compounds, sediment, and sewage spills—as well as the need to enhance water production. Most comment on water resources, however, addresses watershed health. People ask the WCNF to protect watersheds for a number of reasons, but primarily to preserve the water supply for a growing population.
Suggestions to address watershed health include designating sensitive or damaged watersheds and directing future management accordingly, and prohibiting any activities that degrade watershed health. People ask the WCNF to provide detailed strategies regarding water management in the final Forest Plan, and to more adequately analyze watershed condition and the impacts of various activities on watershed health.

Topic 2: Biodiversity and Viability Management

Aquatic and Terrestrial Habitat

Most of the comments on the topic of biodiversity and viability management address wildlife management. Some suggest that the WCNF improve its analysis of wildlife habitat—by instituting appropriate data collection; analyzing anticipated changes in habitat components; and analyzing the effects of tree density and road management on terrestrial wildlife. Respondents state that the WCNF should protect critical wildlife habitat by providing adequate direction for wildlife habitat management, by giving priority to actions that enhance habitat, and by preserving large tracts of land. They suggest improving aquatic habitat protection by tying the monitoring of aquatic resources to specific management implementation, and by maintaining aquatic habitat through different allocations of management prescription categories.

Likewise, respondents ask the WCNF to preserve wildlife habitat corridors—by restoring wildlife habitats within the context of eco-regional planning; by protecting habitat corridors between forest areas; by protecting national forest lands sufficiently to offset adverse effects caused by management practices on private lands; and by prohibiting extractive uses, motorized vehicles, and grazing in wildlife corridors. On the other hand, some ask the WCNF not to manage for wildlife corridors.

Aquatic and Terrestrial Species

Some respondents offer specific comment on a number of species. Some ask the WCNF to reconsider management of non-native wildlife, especially mountain goats and non-native fish; others ask the WCNF to emphasize big game species management and to protect big game winter ranges.

A number of respondents address their comments to predator management, in particular to management associated with the lynx. Some ask the WCNF to protect the lynx by protecting lynx habitat; by taking into account the variety of factors influencing the status of the lynx; and by developing goals, objectives, standards, and guidelines specifically

designed to mitigate impacts on the lynx. Others, however, maintain that studies on lynx management are inconclusive and that the lynx can survive along with traditional multiple use activities. Therefore, these respondents conclude, the WCNF should reevaluate any management prescription category designation, or alternative selection made based on the lynx, and should not restrict activities because of possible lynx habitat.

Another species mentioned often is the native cutthroat trout. People ask the WCNF to restore and expand its habitat and to better address the impacts of non-native fish species.

Management Indicator Species

Various members of the public urge the WCNF to improve its management of management indicator species. Suggestions include prescribing goals, objectives, standards, guidelines, and mitigation measures for all management indicator species by developing an adequate monitoring program for management indicator species; and analyzing the relationships between management indicator species, habitat, and other species. Some suggest selecting additional terrestrial animals as management indicator species, others suggest including predators, or relying more heavily on bird species.

Threatened, Endangered, and Sensitive Species

Respondents request that the WCNF better protect threatened, endangered, and sensitive species. Suggestions include providing a full range of standards and procedures for the selection of sensitive species; managing all threatened, endangered, and sensitive species in the context of the overall, functional ecosystem; improving monitoring of these species; and conducting surveys for sensitive species before allowing certain activities.

Vegetation

People offer a wide variety of suggestions regarding vegetation management. Suggestions include providing a mix of vegetative age classes; maintaining more old growth forest; eliminating commercial timber harvest; ensuring adequate amounts of snags and downed wood; acting to reverse aspen decline; maintaining sagebrush communities; protecting the habitat for five unique species of wildflowers; revegetating with seed from native plants; and preserving nonvascular plant species. Some also express concern over management of noxious weeds. Some suggest restricting activities in areas where noxious weeds occur such as to avoid spreading them; others, however, say the WCNF should more fairly evaluate the spread of noxious weeds and not assume it is caused by motorized recreationists.

Topic 3: Road and Access Management

Road and access management is a topic of great interest and concern to many respondents. Many of the comments that appear in this section of the document are closely related to comments in Recreation section.

Road System Management

Numerous respondents comment on management of the road system. A few ask the WCNF to address Revised Statute 2477 (RS 2477) roads—by evaluating the direct and cumulative impacts of road closures on RS 2477 routes, and by recognizing RS 2477 road rights-of-way claimed by local governments for all routes in existence prior to 1976. Most who comment on the road system, however, address the topics of construction, maintenance, closure, removal, and obliteration. In addition to general comments summarized below, respondents make many site-specific requests for road management actions, management prescription category allocations, and recreation allocations that would allow or restrict types of travel.

Road Construction/Reconstruction – A number of people say the WCNF should allow road construction—by allowing construction of temporary roads as needed, or by allowing reconstruction of road and trail segments that are causing environmental impacts. Some people say that road construction should be allowed in roadless areas.

Others, however, state that road construction should be prohibited, or should be prohibited within certain areas. For example, one person suggests the WCNF prohibit roads across amphibian travel routes, while another respondent suggests it be prohibited in tundra and talus ecosystems. Some also maintain that it should be prohibited in roadless areas.

Road Maintenance – While opinion is divided over the topic of road construction, there is a general consensus that existing roads should be better maintained. Some ask the WCNF to address its road maintenance backlog. One person relates having witnessed very inefficient maintenance activities, and so admonishes the WCNF to be more efficient with road maintenance funds and personnel. Some suggest the WCNF raise road maintenance and construction standards in order to lessen environmental impacts. Specifically, some suggest removing all culverts and replacing them with bridges across permanent streams; increasing bridge maintenance; and minimizing the impacts of road maintenance near stream channels.

Road Closure/Removal/Obliteration – Most who address this topic request either that the WCNF close and reclaim roads under certain conditions or that it convert roads into trails. With respect to the former, respondents suggest the WCNF close roads in environmentally sensitive areas; that it close roads strategically in order to link roadless areas; and that it follow through with closure and reclamation of roads after timber projects are complete. With respect to the latter, one respondent suggests the WCNF consider an alternative that converts the backlog of unmaintained roads to motorized trails in order to provide challenging recreation opportunities at lower costs, while another requests that it continue converting roads to single-track trails. Most motorized recreationists, however, strongly object to road closures, including obliteration. Some feel that obliteration causes more damage than the existing roadbed.

Trail System Management

Just as management of the road system is a frequent topic of comment, so is management of the trail system. On a general level, a few individuals ask the WCNF to address trail system management in coordination with local user groups and to retain emphasis on trail system planning in the Tri-Canyon area. In addition to comments summarized below, respondents make site-specific requests for trail management actions.

Trail Construction/Reconstruction – Several people ask the WCNF to expand the motorized trail system. Suggestions include providing sufficient summer motorized use zones to allow expanded trail systems; expanding the motorized trail network by taking advantage of existing snowmobile parking lots and trail corridors or by reopening some old logging roads as off-road vehicle trails; and providing more motorized loop trail systems. Some also state that motorized trails should be allowed in roadless areas.

Others, however, urge the WCNF not to expand the motorized trail network on the grounds that there is already sufficient motorized recreational access. Some say the WCNF should first maintain and streamline the existing motorized trail system before constructing new trails. Other individuals say, moreover, that motorized trails should not be constructed in roadless areas.

While most general comments regarding trail construction revolve around motorized trails, a number of site-specific requests regarding trail construction address non-motorized trails.

Trail Maintenance – Several people request the WCNF increase trail maintenance. Suggestions include investing more resources in trail maintenance in order to mitigate damage caused by off-road vehicle and hiking use; clearing trails early in the season to prevent damage caused by rerouting; adopting trail maintenance methods to reduce stream sedimentation; redesigning problem trails rather than closing them; improving the safety of trails used by horses; and increasing winter grooming and snowplowing.

Trail Closure/Removal/Obliteration – Some respondents express concern over trail closures for wildlife; one respondent suggests the WCNF use seasonal rather than permanent closures for wildlife whenever possible, and close trails to motorized use only if negative wildlife impacts are specifically documented. Additionally, this respondent suggests that the WCNF should relocate any routes that would otherwise be closed by timber, mining, or grazing activities. At the same time, one individual states that the WCNF should prevent user-caused conversion of single-track trails to off-road vehicle trails through closures and enforcement.

Travel Management

Members of the public offer many comments related to travel management. Some request that the WCNF better analyze travel needs. Suggestions include inventorying and ground-truthing all roads and trails during the travel management planning process; estimating the number of miles and locations of user-created trails; fully considering issues found in publication FS-643, Roads Analysis; compiling more statistics about use levels and opportunities for different recreational types; and analyzing the comparative effects of different uses.

Other respondents are concerned about the effects on travel management of possible conflicts between management prescription category and recreation allocations. Some individuals ask the WCNF to define how such conflicts would be resolved; others ask that, given possible conflicts, prescriptions that are open to misinterpretation be removed. Most comments related to travel management, however, consist of site-specific requests for travel prescriptions, either for specific roads or trails or for specific areas. Most of these requests pertain to motorized versus non-motorized use, both summer and winter.

Topic 4: Recreation and Scenery Management

Management General

Recreation is the most frequent topic of comment on the WCNF Draft EIS and Forest Plan. A number of respondents express general concerns about recreation management, such as that the WCNF should manage recreation and other forest uses responsibly; should treat all user groups fairly; should disperse recreational users; and should not restrict access. Quite a few respondents also ask the WCNF to more adequately analyze recreational impacts and to conduct a carrying capacity analysis, especially in the Tri-Canyon area, which is of particular concern to many Wasatch Front residents. Some people say the WCNF should educate the public on proper use of the land and increase enforcement, particularly before imposing further restrictions.

People also offer many general comments on allowing or restricting specific activities. Some say recreational motorized activities should be allowed in order to promote family values, prevent crime, and to accommodate the growing population, as well as to maintain the economic benefits derived from recreation. Others say recreation should be restricted to protect the environment, forest health, and riparian areas. In addition to such general comments, many respondents offer views specific to certain areas of management or types of recreation. These comments are summarized below.

User Conflicts

Both summer and winter recreationists express great concern over user conflicts. People suggest the WCNF consider examples of how other forests have reduced recreational conflicts, and that it implement a variety of remedies. One example is back-county skiers that ask the WCNF to segregate users. Many snowmobile enthusiasts, however, disagree.

While many non-motorized recreationists assert that motorized vehicles must be restricted to reduce environmental harm, user conflicts lie at the center of many requests for restrictions.

Monitoring and Enforcement

Most who comment specifically on monitoring and enforcement ask the WCNF to monitor motorized recreation and enforce regulations. Both motorized and non-motorized users often say the WCNF should enforce regulations, though motorized users specifically add that this should be done rather than restrict their motorized activities. A number of writers ask the WCNF to monitor motorized recreation and enforce regulations in specific areas.

While many respondents—both in comments directed specifically to monitoring and enforcement and in comments offered in other contexts—suggest that specific areas should be closed to winter and/or summer motorized use, or that these activities be otherwise restricted in order to reduce user conflicts, others argue that such closures/restrictions will be meaningless without the resources to truly enforce them.

Motorized Recreation – Off-Road Vehicles

As noted previously, comments about motorized recreation overlap extensively with general travel management, access, Recreation Opportunity Spectrum, and management prescription category comments. Opinion on this subject is quite polarized and many respondents submit their personal experiences to justify restrictions or their opposition to them.

Many respondents state that motorized recreation should be allowed, because it is a legitimate activity and because it does not harm the environment. These respondents also say off-road vehicle recreation should be allowed because the majority of the public supports it; because it is growing in popularity; because education of motorized users is working; and because motorized access leads to higher public appreciation of nature.

A number of people say it should be allowed because of its importance to families, because it is needed for safety or emergency use, and because it is needed to provide the disabled and elderly access to forest lands.

Many other respondents, however, state that motorized recreation should be prohibited or restricted. Often they say restrictions are needed because of the harm off-road vehicles do to the environment. People say restrictions are needed, further, because of erosion caused by user-created trails; because of the cumulative impacts resulting from the exponential increase in numbers of motorized users; because of noise and air pollution; because it affects non-motorized users' quality of experience; and because there are already adequate opportunities elsewhere in Utah.

Some respondents also make a point of refuting the argument that continued motorized access is needed to accommodate the elderly.

Motorized Recreation – Snowmobiles

A number of respondents ask the WCNF to more adequately analyze the impacts of snowmobiling—by analyzing the impacts of having massive areas of compacted snow due to snowmobile use; reevaluating the advisability of allowing snowmobile use when snow cover is less than or equal to 12 inches; by incorporating new data into travel management planning about the effects of 2-stroke engines on the environment; and by analyzing the effects of snowmobiling on air quality, watersheds, and wildlife habitat. Beyond these requests, comments requesting either that snowmobiling be allowed or prohibited/restricted reflect the same concerns offered with respect to off-road vehicle use.

Many comments request site-specific winter closures—or oppose them—especially in the Cache-Box Elder and Uinta management areas.

Motorized Recreation – Heli-Skiing

A number of respondents advise the WCNF to allow heli-skiing to continue—because it does not harm the environment; because noise is a minimal impact; because it is needed for safety reasons and to provide access for the disabled; and because of its positive economic impact.

Others say it should be prohibited or restricted because it negatively impacts wildlife and conflicts with other dispersed winter backcountry users. People express particular concern over its impacts on birds, especially raptors, arguing that frequent helicopter flights in February, March, and April disrupt their nesting habits and hinder reproductive success.

Mechanized Recreation

Most who address mechanized recreation say it should be allowed—because it does not harm the environment; because it has no effect on water quality; because it contributes to the economy; and because there is no evidence that bicyclists pose a risk to other trail users' safety. Some, however, counter that it should be prohibited in certain areas because it harms the environment and is dangerous to hikers and animals. One organization asks that mechanized use be separated from motorized use for travel management purposes. This group acknowledges that there may be a need for limited site-specific restrictions but asks to be closely involved in these evaluations.

Non-Motorized Recreation

Most who address their remarks specifically to non-motorized recreation say it should be emphasized—by giving non-motorized users the highest priority; by designating all

remaining roadless areas for non-motorized use; or by setting aside more areas which meet a variety of non-motorized needs. Many say that certain areas should be restricted to non-motorized uses only—e.g., the Tri-Canyons area, many roadless areas, and the North Slope of the Uintas. A few respondents, however, assert that non-motorized activities should also be restricted due to environmental impacts. According to some motorized users, hikers and skiers disturb wildlife more than they do.

Ski Area Expansion

Several respondents state that ski areas should be allowed to expand. These respondents say the WCNF should not place restrictions on the ski industry based on the speculative possibility that the lynx, or other species, will be placed on the endangered species list; and that the WCNF should maintain a flexible policy rather than impose premature restrictions.

Many other respondents, however, argue that ski areas should not be allowed to expand any further. These people say that public land should not be used to subsidize real estate development; that the ski industry has not experienced growth sufficient to justify expansion; that it would take away non-motorized areas; that it is not something which benefits the whole population; and that it harms the environment. People object not only to expansion in terms of acreage, but also in terms of infrastructure development. They say, for example, that the WCNF should prohibit resort building on prominent ridges; should prohibit development of trams or lifts in roadless areas; and should not allow ski resorts to turn into all season recreation areas or destination resorts.

Topic 5: Roadless Areas/Wilderness Management

Roadless Area Management

Many people ask the WCNF to protect roadless areas, primarily to preserve environmental values. Some assert that regardless of the outcome of national rulemaking, local forests can and should take the initiative to protect these areas during forest planning because they are a limited resource. People ask more specifically to maintain roadless area characteristics of all inventoried roadless areas—by keeping existing roadless areas roadless, and by prohibiting all development and motorized recreation. Some ask that the WCNF protect roadless areas that are adjacent to wilderness areas, others that it designate watershed areas as roadless. Respondents also request roadless designation for a number of specific areas.

Others, however, object to designating areas as “roadless” and that many roadless areas contain roads. Others maintain that there are already enough roadless and wilderness areas, and no more are needed; instead, some suggest, the WCNF should develop a backcountry recreation area designation for roadless areas.

Wilderness Management

Wilderness management and designation is a topic of great interest to respondents. Some ask that the WCNF clarify how wilderness areas will be managed; others express frustration over the time it sometimes takes to develop a management plan for wilderness areas and so ask the WCNF to prepare wilderness management plans in a timely manner. Some suggest that before recommending any more areas for wilderness designation, the WCNF should enforce existing wilderness regulations, provide education, or better explain the balance of resources and the needs of the people. Some suggest the WCNF reexamine the criteria for wilderness evaluation and the underlying legislation, and consider the capability availability, and need of individual roadless areas in determining wilderness potential.

Wilderness Recommendations

Many respondents say that the WCNF should recommend additional wilderness areas for environmental reasons—to link wilderness areas together; to protect ecological health, watersheds, biodiversity, wildlife, threatened, endangered, and sensitive species; and to protect areas from the effects of mining and off-road vehicle recreation. People also request additional wilderness recommendations to allow research and education, to benefit future generations, to preserve the American spirit, and to benefit the economy.

A number of other respondents ask the WCNF not to recommend any more areas for wilderness designation. According to these respondents, wilderness designation is not need inasmuch as these areas can be adequately protected with careful stewardship, and a wilderness designation precludes management tools needed for forest health. People also oppose further recommendations on the grounds that areas should remain open for future generations; that motorized access is needed for the elderly; and that wilderness designations would restrict recreational access and hurt the economy. Some also urge the WCNF not to create de facto wilderness areas by adding more restrictions to proposed roadless areas, or by managing recommended wilderness areas for wilderness values.

Additionally, respondents submit many site-specific requests that certain areas either be, or not be, recommended for wilderness designation, often with detailed personal comments or reasoning for their requests.

Topic 6: Suitable Timberlands

Management General

On a general level, respondents ask the WCNF to clarify timber management prescriptions in the Forest Plan by, for example, including species-specific density requirements and management direction. Several people also ask the WCNF to modify the standards and guidelines related to timber management in a number of ways, generally with the intent to preserve environmental values.

Adequacy of Analysis

Members of the public offer a number of comments on the adequacy of analysis relative to timber management. Some ask the WCNF, for example, to provide a more thorough analysis in compliance with the Forest Service Manual; one respondent suggests using FORPLAN to calculate allowable sale quantity and long-term sustained yield. Others ask the WCNF to analyze the cumulative effects of logging on threatened wildlife, and the effects of timber sales on atmospheric carbon levels. Some ask for more recent monitoring data and the allowable sale quantity for each alternative. It is also requested that the WCNF discuss timber harvest methods in the Final EIS, and that it continue to research best management practices for timber harvest methods.

Timber Harvest

Some respondents ask the WCNF to allow timber harvest. One of the most common reasons given is forest health. People also ask that public fuel wood collection be allowed—to reduce fire hazards, warm households, and finance maintenance backlogs; to prevent waste of natural resources; and to help clean up the forest.

Others say the WCNF should restrict timber harvest, primarily to preserve environmental values. Some urge the WCNF not to use the concept of forest health as a justification for its timber commodity program. People also say timber harvest should be restricted because of its low economic value in comparison with amenity values, and because of the recreational, scenic, and biological values of the forests. A few individuals say it should be prohibited until the WCNF completes a proper accounting of timber harvest costs. Quite a few respondents, therefore, express support for Alternative 1, although often they concede that its ultimate selection is not likely.

In addition to these requests that timber harvest in general be restricted, a number of respondents ask specifically that it be prohibited in roadless areas—to allow natural forest processes to dominate, to preserve ecosystems from fragmentation, to protect wildlife, and to preserve roadless values.

Topic 7: Rangeland Capability, Suitability, and Forage Production

Management General

Most comment regarding rangeland capability, suitability, and forage production addresses specific topics; these comments are summarized below. On a general level, some respondents ask the WCNF to develop improved livestock grazing strategies in the final Forest Plan.

Adequacy of Analysis

A number of respondents offer comment on the adequacy of analysis relative to rangeland management. Several ask the WCNF to adequately analyze the impacts of

livestock grazing—by analyzing environmental and economic impacts, site-specific impacts, and impacts on other forest uses; by documenting the rate of aspen decline; and by analyzing the effects of grazing against the economic benefits. People also ask the WCNF to clarify the relationship between animal unit months and terrestrial conditions; to clarify its discussion of permitted grazing levels; to justify its rationale for only closing three allotments in the Preferred Alternative; and to verify rangeland condition and trend.

Rangeland Management

Respondents offer a wide variety of comment on specific aspects of rangeland management, including comment on goals, objectives, standards, guidelines, management prescription categories, suitability and capability, conditions and trends, properly functioning condition, restoration, monitoring and enforcement, and infrastructure. Most of the suggestions offered are aimed at reducing any negative impacts of grazing. This general concern over impacts is reflected in comments addressed to monitoring and enforcement. People ask the WCNF to monitor and enforce range quality standards and allotment management plans—to protect ecological values, to ensure overgrazing does not occur, to justify grazing at or near current levels, to meet legal requirements, and to protect wildlife and forest health. A few individuals, however, assert that, with proper management, the condition of grazing allotments can be maintained.

Allotments and Permits

Most general comments regarding allotments and permits address the question of whether allotments should be maintained, phased out, or closed. Some respondents say the WCNF should reduce the number of grazing allotments available in order to protect resources—by closing vacant grazing allotments, by honoring existing leases but allowing leases to expire, and by allowing voluntary allotment retirements and voluntary waiving of grazing permits. One respondent, however, maintains that there should be no reductions in grazing allotments.

Grazing

Several respondents urge the WCNF to continue to allow grazing. They believe grazing is an important deterrent to wildfires. They also state that it has been demonstrated in many western states that game animals often prefer and thrive on land holdings that are managed by and for livestock grazing. They assert the value of proper livestock grazing on Utah’s forestlands is much greater than the revenue produced from the grazing fee. People argue that with appropriate management to protect forest resources, grazing is an acceptable use of public land, even of roadless areas, and that it is an important contributor to many rural counties.

Many other respondents, however, urge the WCNF to restrict, reduce, phase out, or prohibit grazing. People recommend it be restricted until condition and trend are verified; they say restrictions are necessary to protect water and aquatic resources and to preserve

recreational experiences. People likewise say it should be reduced in order to reach biodiversity goals; to prevent topsoil erosion, ground terracing, and vegetation destruction; and to restore streams for fishing. People say it should be phased out or prohibited to return to properly functioning condition, to allow vegetation to be restored, to preserve ecological values, to reduce fire hazard, to prevent the spread of noxious weeds, and to preserve scenic quality. Respondents go on to list a number of specific places where they would like to see grazing prohibited.

Topic 8: Special Designations

Members of the public comment in general that the WCNF should identify more lands for special designations. In particular, some ask the WCNF to designate additional Research Natural Areas; one respondent asks it to identify potential areas that could contribute to diversity in the Research Natural Area system. Some ask the WCNF to manage lands as Special Areas in order to prevent impacts that will be harder to reverse, and to consider forming additional Special Areas. Additionally, one respondent asks the WCNF to provide interim protection for eligible Wild and Scenic Rivers by ensuring proposed activities are compatible with protection and designation. Several ask that additional Wild and Scenic Rivers be designated, although a few ask that no more designations be made. Respondents also refer to specific areas which they request be given, or not given, a particular special designation.

Topic 9: Oil and Gas Leasing

Some people ask the WCNF to indicate where oil and gas exploration and development are to be allowed; to develop detailed standards for managing minerals, oil, and gas exploration/extraction in order to protect environmental values; to inspect oil and gas development sites; and to ensure that oil and gas exploration sites are restored. People also ask the WCNF to more adequately analyze oil and gas potential.

A few respondents state that oil and gas leasing should be encouraged. Others say it should be prohibited in roadless areas in order to protect unique and vital habitat, and to preserve roadless characteristics and values.

Topic 10: Fire Management

Members of the public offer a number of general comments regarding fire management. A common suggestion is that the WCNF should evaluate the feasibility of fire management in non-motorized, roadless, and wilderness areas—with respect to protecting habitat, managing small roadless areas, meeting desired landscape goals, and protecting watersheds. Many other comments include specific suggestions regarding fire management strategies.

Some respondents assert that the WCNF should more fully utilize timber harvest and grazing in conjunction with prescribed burns—to avoid wasting resources, to maintain a healthy forest, to avert fire risk, to bring the forest back into historic range of variability,

and to maintain the viability of local economies. Others, however, say the WCNF should reevaluate timber harvesting and mechanical treatments as means to meet forest goals—because of their inability to restore fire-adapted ecosystems, because of the role of standing dead timber in forest wild fires, because mature trees are needed for wildlife habitat, because young trees have high fuel load values, because timber harvesting cannot replace the role of fire in the forest, and because harvested areas show a strong association with increased rate of spread and flame length.

This same difference of opinion is reflected in comments on prescribed burns. Some say the WCNF should not rely on prescribed burns for fire management because they do not prevent high-severity fires and because they are not adequate to meet forest goals. Others say they should be used in order to maintain bio-integrity.

Locatable and Salable Minerals

A few respondents comment on locatable and salable minerals. One requests that the WCNF add objectives for mineral and energy exploration and development, and that it discuss the management direction for geologic, paleontologic, and mineral resources in the Forest Plan. Another respondent asserts that recreational mining should be allowed to continue because it is not harmful; others say the WCNF should restore areas with mining damage in order to protect watershed health and to restore scenic values.

Social and Economic Analysis

Adequacy of Social and Economic Analysis General

Some respondents ask the WCNF to prepare an adequate socioeconomic analysis—by including costs associated with different management activities; by analyzing the receipts and expenditures of the fee demo program; by analyzing the social and economic impacts on all forest users, not just local communities; and by including the results of specific recent studies on recreational economics.

Social Values

The two most common concerns related to social values are population growth and development. Some people urge the WCNF to factor projected population growth into management plans—by identifying the combined impacts of all users instead of viewing them separately, and by acknowledging that population growth will result in restrictions on traditional experiences. With respect to development, most people say the WCNF should prohibit further development of various kinds on the forest. Some say development should be prohibited for environmental reasons—to protect wildlife habitat and winter range, and to protect watersheds. Some say it should be prohibited for social reasons—to provide escape from the urban environment, to preserve natural environments for the future, and to avoid bringing more users into the forests.

Adequacy of Economic Analysis

A number of respondents express concern over the adequacy of the economic analysis and offer suggestions for improving it. Some of the suggestions include separating different industries and communities, using more recent data, disclosing the real socio-economic impacts of the various alternatives, using the travel cost method and contingent valuation method to analyze social and economic valuations, and including information about externalized costs passed on to communities, businesses, and individuals when national forests are developed or intensively managed for various activities. Some ask the WCNF to strengthen its cost/benefits analysis by, for example, providing a full accounting of benefits and costs, including environmental benefits (clean air, clean water, etc.) of undisturbed forest lands; and some ask the WCNF to provide a full accounting of costs associated with various activities, such as timber harvest and grazing.

A number of respondents comment on the net public benefits analysis. A few ask the WCNF to revise or eliminate that analysis because the 50-year time frame is meaningless and because it is based on faulty assumptions. Others say the that WCNF should establish accurate benchmarks for the net public benefits analysis; that it should establish an analytical process to demonstrate that the final Forest Plan will maximize net public benefits; and that it should quantify ecosystem service values and externalized costs of commodity production in the net public benefits analysis.

Economic Impacts

Several respondents ask the WCNF to acknowledge the important economic contribution of various activities, such as recreation and tourism, motorized use, and grazing.

Lands, Real Estate, and Property Boundary Management

Several people write to say the WCNF should acquire additional private lands—to protect multiple resources, to protect moose habitat, and to preserve watersheds. One individual asks the WCNF to eliminate all private inholdings in roadless areas. Another person advises the WCNF to consider additional land exchanges, but only with adequate public involvement; others, however, urge the WCNF not to exchange lands within the Tri-Canyon area which would compromise watershed health and wildlife or which would create developable private property.

Additionally, a number of respondents request that the WCNF acquire more access rights-of-way across private lands; while one respondent asks the WCNF to process easement applications in a timely fashion for inholders. Recreational access, both motorized and non-motorized, is of particular concern as adjacent private lands become increasingly developed.

Analysis of Public Comment

All letters, emails, faxes, comment forms, and transcripts of public hearing testimony received as public comment on the proposed forest plan and DEIS were compiled, organized, read, and analyzed by the U.S. Forest Service Content Analysis Team (CAT). This team, a unit of the U.S. Forest Service Washington Office Ecosystem Management Coordination branch, specializes in public comment processing and consideration. This team uses a process they have developed called "content analysis" which allows systematic review of public comment on a proposed plan or project through the creation and use of comprehensive electronic comment database. This method is particularly effective in analyzing voluminous comment both individually and collectively, as required by NEPA.

The CAT analytical process is comprised of three main components: a categorical coding structure and standardized process for its application, a comment database and mailing list, and a set of summary reports. In the content analysis process, each letter, postcard, transcript text, or other document (collectively referred to as "**response letters**" in this appendix) is assigned a unique tracking number. Each author or signatory to a response is called a "**respondent**". All respondents' names and addresses are entered into a project-specific database program to produce a complete mailing list. Each respondent is also assigned a unique identifier number for tracking purposes. All respondents are linked to their individual responses and comments in the database using these identifying numbers. Project-specific demographic information is also recorded in the database, such as any self-identified organizational affiliation or whether the response letter submitted is part of an organized response campaign.

Staff analysts then read all public response letters in their entirety and proceed to identify discrete **comments** within them that relate to a particular concern, resource consideration, or proposed management action. Every effort is made to keep each comment within sufficient context that it is a stand-alone statement. Analysts look for not only each action or change requested by the public, but also the reason(s) behind each request in order to capture the full argument of each comment. Therefore, paragraphs within a response letter may be divided into several comments because multiple arguments are presented, or alternatively, several paragraphs that form one coherent statement may be coded into one comment. While simple statements of opinion without a rationale are captured in the process and entered in the project database, it is the strength of each rationale as a complete argument that provides the interdisciplinary team a substantive comment to consider.

Once stand-alone comments are identified, analysts assign each comment to a numerical code that identifies the overall subject area. They use a systematic numerical categorization or "coding" structure that has been specifically tailored to project documents. Each project-specific coding structure is a tool to help sort comments into logical groups by topics. In this case, the coding structure was organized to follow the topic order of the DEIS and components of the proposed forest plan documents, and was designed to be inclusive rather than restrictive in order to sufficiently capture all

comments. Depending on project complexity and needs, analysts may also assign secondary codes to track those comments that refer to such subtopics as specific plan or EIS elements, land areas, or individual roads or trails, to permit finer-scale sorting of comments. The coding structure and other supporting documentation is available in the administrative record at the Supervisor's Office in Salt Lake City, UT.

After being coded, each response letter's set of coded comments is entered verbatim into the project database. This database serves as the complete project record and allows analysts and planning team members to run specialized reports, identify public concerns, and determine the relationships among them.

The content analysis process also identifies all response letters that are submitted as part of an organized response (or "form letter") campaign and therefore contain identical text. These are grouped by campaign, and all mailing information for each respondent is entered into the project database, as well as an identifier code for the campaign. Analysts also code a "master" campaign letter and enter all comments verbatim into the project database so that they are considered alongside all non-campaign comments. If a respondent adds original comments to the organized response letter he or she submits, these comments are identified, coded and entered into the database.

The third phase of content analysis includes composing statements of **public concern** and then preparing a narrative summary. Analysts review the entire comment database, sorted by topic area, and then write public concerns to summarize comments that present similar arguments or positions. Each formal statement of concern is accompanied by one or more sample comments which provide respondents' specific perspectives and rationales regarding that concern. For each sample comment a letter number is provided, enabling the reader to track and review the original response, if necessary.

Each public concern is worded to capture the action that one or more members of the public feel the Wasatch-Cache National Forest should undertake and provides the decision-maker with a clear sense of actions the public is requesting. Because each concern statement is a summary, it can represent one or many comments, depending on the actual comments submitted. Concern statements range from extremely broad generalities to extremely specific points because they reflect the content of verbatim public comments. Once the comments have been exhaustively reviewed and the range of concerns identified, CAT then submits a **Summary of Public Concerns** report to the interdisciplinary team, who is responsible for the next stage of comment consideration, response to comment. At this stage, the interdisciplinary team determines whether comments are substantive and in scope, and then composes responses to comment. For more information on the content analysis process, the reader may contact the forest Service Content Analysis Team in Salt Lake City, UT.

Public concern statements are not intended to replace actual comment letters or sample quotes. Rather, they can help guide the reviewer to comments on the specific topic in which he or she may be interested. All original response letters in their entirety are on file at the Supervisor's office in Salt Lake City, UT.

Although the list of public concerns attempts to capture the full range of public issues and concerns, it should be used with caution. Respondents are self-selected; therefore their comments do not necessarily represent the sentiments of the public as a whole. However, these reports do attempt to provide fair representation of the wide range of views submitted. In considering these views, there is no attempt to treat input as if it were a vote. Instead, the content analysis process ensures that every comment is considered at some point in the decision process.
The final CAT reports are summary documents. As such, they are not intended to replace the need for interdisciplinary team members and decision-makers to directly review all responses and comments. Database reports by topic area allow systematic review of all public responses by subject area. Given the rapidly expanding volume of responses during comment periods due in part to increasing public interest and the widespread use of email, this process can greatly enhance methodical review of comments and meet our goal to continually improve decision-making and responsiveness to the public.

Considering Different Types of Comments under the National Environmental Policy Act

Agencies have a responsibility under the National Environmental Policy act (NEPA) to first "assess and consider comments both individually and collectively" and then to "respond… stating its response in the final statement." The content analysis process used by the U.S. Forest Service Content Analysis Team (CAT), described in the previous section, considers comments received "individually and collectively" and equally, not weighting them by the number received or by organizational affiliation or other status of the respondent. Public concern statements and supporting quotes from public input form the basic summary of public comment and were the primary focus of our interdisciplinary team in considering comments.

The NEPA requires that after we consider comments, we formally respond to substantive comments. However, the nature and extent of each response depends on the type of concern identified.

We classified comments, or the concerns identified from them, as either those that fall within the scope of decision-making for the plan revision or those that fall outside of the scope for any number of reasons described below. Generally, the types of comments received, and concerns identified, that were considered out of scope include those that:

- Do not address the purpose, need, or goals of the Wasatch-Cache National Forest 2003 Forest Plan Revision (e.g. propose an action in areas beyond the Wasatch-Cache National Forest jurisdiction or that are not directly related to the action proposed in the plan, or relate to day-to-day operational issues such as law enforcement procedures or road maintenance).
- Address concerns that are already decided by federal law or national policy.

- Suggest an action not appropriate for the current level of planning (site-specific decisions to construct new roads, campgrounds or facilities, to offer special use permits or the sale of timber resources).
- Propose untenable restrictions on management of the forest or conflict with approved plans not being revised in the forest plan revision process.
- Did not consider reasonable and foreseeable negative consequences.

We further classified comments within the scope of the plan as either substantive or non-substantive. Based on the Council of Environmental Quality's regulations, a substantive comment is one that:

- Questions, with a reasonable basis, the accuracy of the information in the environmental impact statement.
- Questions, with a reasonable basis, the adequacy of environmental analysis as presented.
- Presents reasonable alternatives other than those presented in the DEIS that meet the purpose and need of the proposed action and address significant issues.
- Cause changes or revisions in the proposal.

Non-substantive comments, or concerns identified from them, include those that simply state a position in favor of or against an alternative, merely agree or disagree with Forest Service policy, or otherwise express an unsupported personal preference or opinion.

We are required to respond only to substantive comments or the concerns identified from them. We have chosen to respond to all public concerns identified during analysis of public comment, within and out of scope, substantive and non-substantive alike. Responses to out of scope concerns are generally restricted to explaining that the concern is out of scope and does not merit further attention. A more elaborate answer may have been provided for clarity. Responses to substantive concerns are typically more extensive, complete, and most importantly, offer an explanation of why or why not and where the concern may have resulted in changes to the plan or analysis. If several concerns are very similar, they have been grouped for response purposes. Public concerns that identified editorial or other errors in the presentation of information in the DEIS were used to revise text and make corrections for the FEIS.

Agency Response to Comments

As described in the previous section, each public concern statement was derived from one or many individual public comments. However, these supporting sample comments have been deleted here due to space constraints. Our interdisciplinary team reviewed the actual letters, public concern statements and the supporting comments in the preparation of our responses. Interested parties may consult the full CAT reports and the reading file of original response letters on file at the Supervisor's Office in Salt Lake City, UT.

Public concern statements and our responses are organized by section to mirror the order of the **final environmental impact statement** (FEIS) by topic area.

Planning and Decision Processes

Adequacy of the Document

Document Organization and Layout

1. **The Wasatch-Cache National Forest should be congratulated for the clarity of its planning document.**
   Response: Thank you.

2. **The Wasatch-Cache National Forest should continue to improve planning document by providing a more detailed table of contents or an index.**
   Response: Every effort was made to write in plain English and to use charts and maps to more effectively present information. We have worked to improve the clarity in the draft environmental impact statement. We have now added a listing of all tables and figures and created a more detailed table of contents.

3. **The Wasatch-Cache National Forest should produce a cross-walk document to clarify the relation between the current and the proposed Forest Plan, with potential impacts listed for each change.**
   Response: Alternative 4 represents the 1985 (current) Forest Plan as amended. To the extent possible, differences between Alternative 4 can be compared with Alternative 7, which has been developed in the Revised Plan. Many of the standards and guidelines contained in the 1985 Plan are site-specific direction that is inappropriate for programmatic type documents. The revised forest plan is based on a framework strategy so a one-to-one correlation from one to the other is not possible.

4. **The Wasatch-Cache National Forest should improve the quality of planning document maps.**
   4.1 Provide sufficient detail for site-specific travel analysis by the public.
   4.2 By increasing readability

4.3 By using more color
Response: We believe the detail of our maps is appropriate for the broad scale type of planning such as the revised forest plan. Site-specific travel planning for roads and trails is a future analysis, not a part of the forest planning analysis. Because of this we don't see the need for more detailed maps addressing this need. Recreation Opportunity Spectrum maps portray the six broad classes of opportunities, not the management of every trail and road.

Printing color maps with the draft EIS was very expensive. We continually evaluate the balance between spending federal dollars wisely versus communicating proposed forest direction. Color maps showing management prescriptions by alternative can be viewed in the complete documents package, on a CD or our website. Color maps are included as part of the Revised Forest Plan.

5. **The Wasatch-Cache National Forest should number and reference all plates in the final Forest Plan.**
Response: We have titled and referenced the oil and gas maps that you refer to as plates.

6. **The Wasatch-Cache National Forest should correct errors in the plates included in the draft Forest Plan.**
Response: Errors have been corrected. Corrected maps are available in the FEIS and Plan complete sets, on CD-ROM and posted on the internet.

7. **The Forest Plan should include Figure 2-1 as referenced in the text.**
Response: The Figure has been properly labeled and referenced in the text.

8. **The final Forest Plan should include Revision Topic 11 as referenced in the text.**
Response: There are 10 revision Topics. This paragraph has been edited to clarify the number of topics.

9. **The Wasatch-Cache National Forest should edit the poorly written "Response to Issue 5" section in the draft Forest Plan.**
Response: We have edited this section.

10. **The Wasatch-Cache National Forest should improve the organizational structure of Chapter 5.**
Response: We have improved the layout and structure of the Chapter 5 in the Revised Forest Plan. The monitoring section is part of the forest management direction of Chapter 4. The process management direction section has been reformatted and moved to an Appendix X called Implementation Guidance.

General Adequacy

11. The Wasatch-Cache National Forest should expand and quantify effects analysis discussions throughout the Final EIS by replacing the extensive reliance on professional opinion.

Response: Planning for a unit of the National Forest System involves two levels of decisions. The first is the development of a Forest Plan that provides direction for all resource management programs, practices, and protection measures. The second level of planning involves analysis and implementation of management practices designed to achieve goals and objectives of the Forest Plan. This level involves site-specific analysis to meet NEPA requirements. By the very nature of programmatic planning it is impossible and inappropriate to quantify site-specific effects. Since the Forest Plan is a broad framework, which does not directly commit to development, there are inherent limitations in predicting what development, and consequently what effects, will actually occur. When we have relied on science to support our analysis, it has been cited. In some cases, however science is simply not available and we must rely on the professional judgment of resource specialists.

12. The Wasatch-Cache National Forest should better balance the effects analysis of management activities by changing biased statements that exaggerate the benefits of active management.

Response: We have improved watershed and wildlife sections to more fairly evaluate the effects of active management.

13. The Wasatch-Cache National Forest should properly account for and mitigate cumulative effects.

Response: In reviewing the adequacy of the cumulative effects analysis in the EIS, it's important to acknowledge that the cumulative effects for a forest plan are quite different than those of a site-specific action. We have expanded the discussion of other agency actions and private land effects in Chapter 3 of the FEIS to the degree that is appropriate in a programmatic document. In addition because the Plan does not make an irretrievable commitment of resources, we are not relying on mitigation measures to reach a Finding of No Significant Impact.

14. The final Forest Plan should not rely on best management practices (BMPs) to mitigate cumulative environmental effects because this is insufficient to ensure compliance with the Clean Water Act

Response: We feel that BMPs, standards and guidelines, and soil and water conservation measures are effective means to reduce adverse effects from site-specific project implementation. The revised Forest Plan does not propose site-specific projects of which mitigation measures could be proposed, but provides for broad-scale planning. At this scale of planning, the revised Forest Plan identifies BMPs, standards and guidelines, and soil and water conservation measures as ways the WCNF can use to reduce adverse effects of site-specific projects. Projects that implement the revised Plan may use mitigation measures to reduce adverse effects and it is at this point that effectiveness of mitigation measures should be evaluated.

The Forest Plan assumes that BMPs will be used during project implementation to reduce impacts from a site-specific project.

For their respective states, Utah and Wyoming have authority to determine compliance with the CWA. The State of Utah provides the authority to use BMPs to control nonpoint sources of pollution as stated in section 3.2 High Quality Waters – Category 1 in section R317-2-3. Antidegradation Policy, in R317-2, Utah Administrative Code (FEIS reference: Utah, State of. 2000a).

15. The Final EIS should include an analysis of risks from private lands that affect the health of the forest and adopt a more conservative strategy in the Forest Plan
Response: We agree that the adjacency of private lands to the Forest and their development contribute to effects on national forest system lands in varying degrees. We have expanded the discussion of other agency actions and private land effects in Chapter 3 of the FEIS to the degree that is appropriate in a programmatic document. As we developed the forest plan it was always with an awareness of the context of the forest and private lands.

Public Involvement and Collaboration

Public Information

Accessibility of Information for the Public

16. The Wasatch-Cache National Forest should recognize that complex changes to management prescription categories between scoping and draft have made meaningful public comment difficult.
Response: We agree the definitions of management prescription categories have evolved since they were first introduced in the preliminary AMS. Much of this change was the result of incorporating public comment and adapting to national initiatives. We recognize their application and interpretation in each alternative does require thoughtful analysis. However, because of this we specifically included very detailed tables of allowed activities with each alternative description in Chapter 2.

Use of Information in the Decision Process

17. The Wasatch-Cache National Forest should base its decision on sound science.
Response: Sound science should always be the basis for decisions. However, often, science is simply not available for many of the decisions we make. In some cases there are differing scientific opinions and no one definitive answer exists.

18. The final Forest Plan should state that all accompanying technical documents will undergo external peer review.
Response: The level of scientific scrutiny requested is not a requirement of the 1982 implementing regulations for the National Forest Management Act. Many of

the technical documents that were relied upon in our analyses are those published in scientific journals. The planning team has used the best available information to conduct their analyses

Public Involvement Efforts

19. The Final EIS should evaluate the effects of multiple planning processes on public involvement.
Response: We recognized the demands placed on the public because of the many national and local planning efforts that were ongoing during our 4-year revision process. Because of this we included extended periods for public response when possible, such as a 5-month review period for the DEIS.

20. The Wasatch-Cache National Forest should continue its extensive public outreach efforts.
Response: We view public outreach as very important and plan to continue our efforts.

21. The Wasatch-Cache National Forest should expand its outreach efforts with motorized recreationists to improve support for travel management decisions.
Response: We are always striving to improve public outreach so those affected by management decisions participate in their formulations and understand and are fully aware of them when they are implemented. Organizations representing special interests provide an excellent opportunity to increase our outreach. We do have to balance our outreach efforts with available personnel, time, and expense.

22. The Wasatch-Cache National Forest should eliminate its bias toward commercial interests in its consultations with stakeholders.
Response: We do not feel that we are biased in our conversations with commercial interests. We often ask questions of our constituents to characterize the current condition from their point of view. We always acknowledge the source of our information.

23. The Wasatch-Cache National Forest should improve outreach efforts to out-of-state residents by holding informational planning meetings at the ski resorts.
Response: Skiers, often out of state residents, represent a unique situation for public outreach. Many receive information in the mail and respond in writing. In the past informational meetings held at the ski resorts have been poorly attended since most visitors are more interested in leisure activities. Ski area permittees often distribute material to their guests. Our mailing list reveals out of state addresses, many whom are skiers.

24. The Wasatch-Cache National Forest should improve outreach efforts to Hispanic residents during Forest Plan implementation and future planning by publishing documents and holding meetings in Spanish.

Response: We agree this is an increasing segment of our society that requires a specialized approach.

25. The Wasatch-Cache National Forest should not allow intimidation at public meetings by disallowing inflammatory threats of closure violations and accusations of terrorism by environmentalists.
Response: We too regret that some members of the public felt their safety was being threatened. While we did have law enforcement present at those meetings it did not stop the confrontational attitude of some members of the public. We felt if we had taken a more aggressive stance, we may have incited violence.

26. The Wasatch-Cache National Forest should not schedule meetings during hunting season.
Response: There are so many segments of society that compose those interested in forest management, it is next to impossible to plan public meetings that don't conflict with someone's schedule. Public meetings were logically scheduled in relationship to the steps in the planning process.

Use of Public Comment in the Decision Process

27. The Wasatch-Cache National Forest should provide clear guidelines on how to write effective comments.
Response: We recognize with such a comprehensive set of documents, such as the revised forest plan, it is extremely difficult to know where to focus one's review. You make a good suggestion to consider when releasing future planning documents for public review.

28. The Wasatch-Cache National Forest should make submitting email comments easier by providing a direct link from the website.
Response: We published our e-mail address and received a large share of comments via the internet. Adding a link is an avenue we will explore.

29. The Wasatch-Cache National Forest should weigh public comments differentially.
29.1 By giving particular attention to comments submitted by college students
29.2 By giving greater weight to users who pay fees
29.3 By giving greater weight to comments from local residents
Response: The Wasatch-Cache National Forest is a national resource and decisions regarding the management of this forest are made in conjunction with national as well as local concerns. There are many viewpoints within Utah and within the nation that the Forest must consider. All of these comments are valid and were reviewed and considered in the final documents.

30. The Wasatch-Cache National Forest should give equal weight to comments from out-of-state residents.
Response: See response 29.

31. The Wasatch-Cache National Forest should establish a clear standard for consideration of public comment by prioritize detailed, scientifically-backed comments.
Response: Every comment received was read and considered when developing the revised forest plan and FEIS.

32. The Wasatch-Cache National Forest should use misinformed public comments to frame its educational strategy for users.
Response: All of the public comments received have been very instructive in where and how we need to focus our information and education strategy. Working with community groups and organizations is one way of spreading resource management messages. These activities are very important and will continue to be a tool used to spread information in the future. We included an objective in the Revised Forest Plan emphasizing the areas of our education efforts as we implement the Plan.

33. The Wasatch-Cache National Forest should not make the comment consideration process a vote.
Response: We agree. Public comments are not considered votes when making a decision. Every substantive comment and suggestion has value whether expressed by one respondent or many. Public comments help us better understand the sentiment behind particular viewpoints and values, reveal new information previously not considered, and provide clear understanding of the implications of our decisions for various interests.

34. The Wasatch-Cache National Forest should consider broader public opinion.
34.1 Rather than just that of people who officially comment in writing
34.2 Rather than just that of people who are vocal in public meetings.
Response: Please see the response to 33. Decisions made in the revised forest plan are not determined by public opinion. We have followed the NEPA and NFMA regulations that provide direction on solicitation of public input. It relies on those who make written and oral comments.

35. The Wasatch-Cache National Forest should establish better means of creating dialogue with the public rather than delayed summary responses to written and oral comments.
Response: At this final stage of the revision planning process, we agree that responding in writing to comments is not very satisfying to either those who wrote the comments or for us as forest planners and managers. A written response to substantive comments is required by the implementing regulations of NEPA. During the previous phases of the planning process we felt that constructive dialogue was conducted between many parties. Individual conversations at open houses, discussions with organizations at their invitation and constituent phone calls were very informative. Open houses are planned shortly after the release of the decision. In addition, we look forward to having more dialogue at the local level for small-scale projects as the revised plan is implemented.

36. The Wasatch-Cache National Forest should convene town meetings prior to finalizing the Forest Plan.
Response: We agree that some type of meeting with engaged citizens is worthwhile and scheduled open houses shortly after releasing the decision.

37. The Wasatch-Cache National Forest should canvass public opinion.
37.1 By taking a public opinion poll.
37.2 By surveying forest users.
Response: Please see the response to 33. Decisions in the revised forest plan are not the result of a public opinion survey or a vote counting process in which the outcome is determined by the majority viewpoint.

38. The Wasatch-Cache National Forest should provide specific responses to individual comments on the preliminary alternatives.
Response: We have found that there is a common misperception among some members of the public that because the decision does not reflect their opinion then we have not considered their opinion. When making a decision we have to look at the broad array of comment, which is often conflicting, and then make a reasoned choice. Rarely do we make a decision that satisfies everybody. With a comprehensive effort such as forest planning, a response to every comment heard at every phase is an unwise use of planning resources. At the preliminary alternative phase, we believed planning team efforts were more wisely spent analyzing and incorporating comments instead of developing specific responses to individual comments.

39. The Wasatch-Cache National Forest should not allow public sentiment to overrule environmental protection when damage is occurring from overuse.
Response: We agree.

Involvement of Interest Groups in the Planning Process

40. The Wasatch-Cache National Forest should consult with mountain bicycling organizations early in the summer travel management planning process.
Response: All user groups should be involved in scoping efforts during future site-specific travel planning. Successful implementation of decisions often depends on involvement throughout the process.

41. The Wasatch-Cache National Forest should consult with user groups before closing trails to them (ie. mountain bikers).
Response: Being involved in future site-specific travel planning will allow user groups to voice their comments and be informed of decisions.

42. The Wasatch-Cache National Forest should include motorized recreation planners on the interdisciplinary team and advisory boards.
Response: We intend to include all interested parties including user groups and their representatives in future travel planning following the guidelines of the Federal Advisory Committee Act.

Influence of Interest Groups in Decision-making

43. The Wasatch-Cache National Forest should not cater to special interest groups.
43.1 Environmental groups
43.2 "Eco-terrorists"
43.3 Influential private and corporate interests
43.4 Motorized recreational groups
Response: Throughout the planning process there has been a broad array of public viewpoints expressed. Each point of view believes the opposing interests are receiving preferential treatment. This is simply not true. The planning team has met with any individual or group to discuss their concerns when a request was made. All of comments were reviewed and considered in the final documents.

44. The Wasatch-Cache National Forest should determine what constitutes a special interest according to the group's impacts on forest lands, giving the greatest consideration to those causing the least destruction.
Response: We use the term "special interest" to help us understand the needs and demands of many varied forest users. Because of the many varied interests there is no normal use of the forest. The range of alternatives responds differently to each issue thereby gives greater consideration to one type of user versus another. Regardless of a person or groups' interest all forest uses should be properly managed.

45. The Wasatch-Cache National Forest should consider that special interest groups provided biased information to their members.
45.1 Motorized groups
45.2 Environmental groups
Response: All comments were reviewed and considered in the content analysis process whether they appear to be based on misinformation or not. Comments that were apparently based factual errors or misinformation are responded to by correcting the error or by offering the agency's position on the issue.

46. The Wasatch-Cache National Forest should discount research conducted by environmental groups.
Response: We generally use research from scientific journals. When information is used from non-scientific journals it is cited as such.

Trust and Integrity

47. The Wasatch-Cache National Forest should deal honestly with the public.
Response: We agree honesty and integrity are vital for good relationships with the public. We also recognize that in any communication between two people there's a chance each may interpret conversations differently. Public feedback on these issues helps us recognize where we may communicate more clearly.

Collaboration

Public Partnerships and Volunteers

48. The Wasatch-Cache National Forest should end all partnerships with private outfitters/guides because the forest should not be used for profit.
Response: Outfitters and guides can help provide opportunities for forest visitors where special expertise, experience or equipment may be needed or offered to those without an outdoor skill base. We agree that outfitted opportunities must always be evaluated in light of public demands for an activity. Criteria to be used when considering outfitter and guide services can be found in the Appendix X describing Implementation Guidance.

49. The Wasatch-Cache National Forest should provide environmental education programs in partnership with the Stokes Nature Center.
Response: We agree. The Logan District staff is currently holding discussions with Utah State University and Stokes Nature Center regarding joint efforts concerning environmental education. We are open to proposals and are always looking for partners to deliver appropriate messages concerning and stewardship.

50. The Wasatch-Cache National Forest should not refuse offers for volunteer programs from motorized groups.
Response: While each volunteer opportunity needs to be evaluated on its own merits, user groups can offer opportunities for peer education and contribute to proper resource management. We are willing to work together in a cooperative setting to promote an accurate, consistent message.

Interagency Collaboration – State

51. The Final EIS should discuss the Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment document.
Response: Please see Revision Topic 10 where we have discussed this long-term program to deal with wildland fire and hazardous fuels situation.

52. The final Forest Plan should provide greater detail about how collaboration with other government entities will be implemented by creating an interagency working group.
Response: The Forest Plan is a broad framework for the management of a National Forest. How further collaboration could be enhanced and expanded is more appropriately left for future implementation efforts.

53. The Wasatch-Cache National Forest should work with the State of Utah to enlarge the recreational motorized vehicle tag format so that the public can read license numbers of violators.
Response: We agree that enforcement issues related to ATVs are important; however, your suggestion is outside the scope of our authority.

54. The Wasatch-Cache National Forest should work with the State of Utah to coordinate motorized recreation management with the use of the state trail ranger programs.
Response: We coordinate extensively with the Division of Parks and Recreation. We have competed successfully numerous times for trail-building grants. In the wintertime we work together on providing snowmobile opportunities through grooming projects.

55. The Wasatch-Cache National Forest should remove the incorrect statement that wildlife reintroductions are carefully and openly planned.
Response: The sentence you refer to is from the desired condition section of the forest plan. Because the Forest Service has the responsibility to prevent damage to resources on national forest system lands, it is our intent to work more closely with the Division of Wildlife Resources as they plan wildlife introductions that affect national forest system lands. We endorse public involvement for wildlife reintroductions.

56. The final Forest Plan should require independent scientific review of native wildlife determinations conducted by state agencies.
Response: Your request is outside of our authority as determined in Forest Service Manual 2641: The state has the responsibility to make the determination as to which wildlife and fish species are native or indigenous.

57. The Wasatch-Cache National Forest should only cooperate with the Utah Division of Wildlife Resources when management is science-based.
Resource: We recognize that sometimes science is not definitive and differing opinions exist. Because our responsibilities are so intertwined, cooperation with state agencies is necessary and desirable.

58. The Wasatch-Cache National Forest should work with the state wildlife agency to eliminate the use of lead shot in the forest.
Response: Your request is outside of our authority. However, for your information according to 2002-2003 Utah Waterfowl Proclamation, only nontoxic shot may be

in possession or used while hunting waterfowl or coot in any area of the state and federal refuges (R657-9-10 and CFR 20.21(j)).

59. The Wasatch-Cache National Forest should work with the State Division of Wildlife and Natural Resources to monitor and encourage wolf migration onto the forest.
Response: A wolf that was trapped in 2002 in the Cache Box Elder Management Area indicates the possibility of more wolves migrating to Utah. If wolves return to Utah they will be under the control of the U.S. Fish and Wildlife Service (FWS) and managed as a threatened species. All activities concerning the wolf would be done through the consultation process with the FWS as outlined in the Endangered Species Act, Section 7. Protection of the regionally significant wildlife corridor as provided in Alternatives 1, 2 3, 6, and 7 makes it possible for many different species to migrate

Interagency Collaboration – County and Local

60. The final Forest Plan should include a goal stating the Forest Service's intent to comply with local zoning regulations.
Response: It is our policy to work with local governments and make very effort to meet the intent of zoning ordinances even though we are not legally required to do so.

61. The Wasatch-Cache National Forest should eliminate the bias established due to cooperating agency status for Uinta County.
Response: Uinta County was granted cooperating agency status because they had special expertise to provide to the planning effort. They have been granted the rights as afforded them in the CEQ regulations implementing NEPA.

62. The Wasatch-Cache National Forest should prioritize the cooperating agency status for Uinta County.
Response: See Response 61.

Interagency Collaboration – Multi-Jurisdictional

63. The Wasatch-Cache National Forest should work with other land managers and adjacent landowners to restore the entire region to properly functioning condition.
Response: We agree and to the extent we can have been working towards that goal. As an example we have been working with an adjacent landowner, Deseret Land and Livestock, in a joint prescribed burn project. The State of Utah also has large blocks of land that lend themselves to joint projects.

64. The Wasatch-Cache National Forest should coordinate management activities with state and private landowners.
Response: Yes, we agree and will continue to do so at the project level.

65. The Wasatch-Cache National Forest should work with the state Division of Natural Resources and county commission to eliminate hunting in the Tri-Canyon area, especially of moose.

Response: This is a decision that is outside of the scope of Forest Planning (see chapter 1 of the FEIS). Members, of the Wildlife Board, set hunting regulations. Representatives from public land management agencies participate on Regional Advisory Councils who then make recommendations to the Wildlife Board. It is through this avenue hunting in the Tri-canyon area is regulated.

Multi-Jurisdictional Planning with Adjacent National Forests

66. The Wasatch-Cache National Forest should reanalyze the High Uintas Roadless Area as one contiguous planning area in conjunction with the Ashley National Forest.

Response: Ideally the planning efforts for both forests would have been scheduled during the similar time frames. Each forest had its own set of unique circumstances that dictated when each would undertake forest plan revision. We have brought forward the direction from the High Uinta Management Plan that was completed jointly with the Ashley National Forest in 1994.

67. The Wasatch-Cache National Forest should work with particular national forests.

67.1 Work with the Caribou National Forest toward wilderness designation for Franklin Basin

67.2 Work with the Uinta National Forest toward recommended extensions to the Lone Peak Wilderness

67.3 Work with the Uinta National Forest to establish consistent requirements for the Snowbird Ski area

Response: Within the range of alternatives analyzed in the Caribou EIS and in the Uinta EIS, recommendations for additional wilderness in Franklin Basin and Lone Peak respectively were considered. In the revised Plans the Uinta and Wasatch do not provide for permit boundary additions in Lone Peak. A sliver of 400 acres north of Mt. Naomi to the state boundary is recommended for wilderness consistent with the wilderness recommended by the Caribou National Forest.

Coordination between the Uinta and Wasatch-Cache for Snowbird Ski Area is best conducted at the Master Development Plan stage.

68. The Wasatch-Cache National Forest should work with all adjacent forests to assure consistent management prescription categories and allocations to achieve landscape-level wildlife connectivity.

Response: The three adjoining forests that are currently revising their forest plans all have very similar management prescriptions. Their application to the ground varies because of the differing capabilities of the landscape and the needs and values of the distinctive populations each serves. Also see Response to 59.

69. The Wasatch-Cache National Forest should work with all adjacent forests to assure consistent travel management plans.
Response: We did to the extent appropriate given the often-differing set of circumstances unique to each forest.

Relationship to Other Planning and Rulemaking Processes

Roadless Area Conservation Rule

70. The Wasatch-Cache National Forest should issue a supplement to the Draft EIS to explain new Roadless Area Conservation Rule interim directives.
Response: The interim directives simply include the Chief's instructions that Forest Plan revisions consider, as appropriate, the long-term protection and management of unroaded portions of inventoried roadless areas. The Forest has considered the values of each roadless area in the FEIS.

71. The final Forest Plan should protect roadless areas in a manner consistent with the Roadless Area Conservation Rule.
71.1 Regardless of the Rule's status
71.2 On the Logan Ranger District
Response: We are applying the Chief's June 7, 2001 direction (incorporated into interim directives) as the overarching guidance for managing inventoried roadless areas in the Revised Forest Plan. It has applied protection similar to the Rule, to some roadless areas while others it has not. On the Logan Ranger District the majority of roadless areas are managed to maintain or mostly maintain roadless values.

72. The Wasatch-Cache National Forest should not manage roadless areas according to Roadless Area Conservation Rule direction.
Response: The terms of the Roadless Area Conservation Rule are not applied to Alternatives 3, 4, 5 and 7. Other alternatives consider the protection and management of inventoried roadless areas by applying terms of the Rule. All give full consideration of the values of inventoried roadless areas on the forest.

73. The final Forest Plan should adopt the "outside roadless area" use tables.
Response: See Response 71.

74. The final Forest Plan should define "likelihood" of degrading roadless characteristics in a scientific manner.
Response: Display of effects to roadless area values has been expanded in the final EIS. A programmatic analysis such as that in forest planning cannot analyze any specific on the ground effects. This disclosure must come at the project level analysis when a site-specific action is proposed.

75. The final Forest Plan should explicitly state whether road construction is permitted by management area prescription in the allowable use tables.
Response: The Revised Forest Plan includes standards and guidelines by management prescription that state whether or road construction is allowed.

76. The final Forest Plan should establish its own strong protection of roadless areas independent of the national roadless rule by assigning all areas to 1.5, 2.6, or 4.1.
Response: The Revised Forest Plan protects inventoried roadless area values to varying degrees. Please refer to Table RW-9 under Topic 5 in Chapter 3 of the FEIS.

77. The final Forest Plan should state that it is not required to comply with the Roadless Area Conservation Rule pending resolution of legal challenges.
Response: In Chapters 1 and 2 of the FEIS we have explained the current status of the Roadless Area Conservation Rule. In Alternative 7 that has been developed as the Revised Forest Plan, we are applying the Chief's June 7, 2001 direction as the overarching guidance for protecting inventoried roadless areas. This direction has been incorporated into Forest Service Interim Directive No. 1920-2001-1. Once a judicial ruling has been made or some further regulations for roadless area management decided upon, we would follow that direction.

78. The final Forest Plan should state that inventoried roadless areas will not be subject to any restrictions beyond the assigned management prescription category.
Response: They will be subject to management direction contained in the revised Forest Plan and any applicable agency policy.

79. The final Forest Plan should comply with the Chief's interim directives.
Response: It does. The Chief has instructed forests to ensure that Forest Plan revisions consider, as appropriate, the long-term protection and management of unroaded portions of inventoried roadless areas. He also stated in the policy that as a general rule inventoried roadless areas should be managed to preserve their roadless characteristics until a forest scale roads analysis is completed and incorporated into a forest plan. This has been done. Inventoried roadless areas are protected in Alternatives 1, 2, and 6. Other alternatives consider the protection and management of inventoried roadless areas by varying degrees. All give full consideration of the values of inventoried roadless areas on the forest.

Legal and Administrative Framework

80. The final Forest Plan should include standards that define whether categorical exclusions can be used when extraordinary circumstances are present.
Response: An agency final interim directive was published in the Federal Register on August 23, 2002 that addressed this issue. Direction such as this is most appropriately addressed in agency handbooks and manuals.

The Forest Planning Process

Purpose, Need, and Significant Issues

Revision Topics

81. The Wasatch-Cache National Forest should expand the roadless area issue discussion to emphasize ecological integrity and inherent values because recreation is over-emphasized.
Response: The examination of roadless areas was expanded considerably between the Draft and Final EIS to consider each area's values individually, in broader contexts, and for values in addition to recreation. See Appendices C-1, C-2 and the Topic 5 discussion in the FEIS.

Decisions Made in Forest Planning

Scale of Decisions

82. The final Forest Plan should clearly define the difference between significant and non-significant Forest Plan amendments.
Response: Forest Service Manual section 1922.5 defines the difference between non-significant (1922.51) and significant (1922.52) amendments. These sections are cited below and further define more general direction established in the planning regulations, 39 CFR 219.10 (f).

1922.51 - Changes to the Forest Plan That Are Not Significant. Changes to the forest plan that are not significant can result from:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management;

2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management; and

3. Minor changes in standards and guidelines.

4. Opportunities for additional management practices that will contribute to achievement of the management prescription.

The Forest Supervisor must prepare an amendment to the forest plan to accommodate a change determined not to be significant. Appropriate public notification is required prior to implementation of the amendment.

1922.52 - Changes to the Forest Plan That Are Significant. The following examples are indicative of circumstances that may cause a significant change to a forest plan:

1. Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected (36 CFR 219.10(e)); and

2. Changes that may have an important effect on the entire forest plan or affect land and resources throughout a large portion of the planning area during the planning period.

When a significant change needs to be made to the forest plan, the Forest Supervisor must prepare an amendment.

Documentation of a significant change, including the necessary analysis and evaluation should focus on the issues that have triggered the need for the change. In developing and obtaining approval of the amendment for significant change to the forest plan, follow the same procedures as are required for developing and approving the forest plan (36 CFR 219.10(f) and 36 CFR 219.12).

Management Direction

83. The Wasatch-Cache National Forest should produce a high-quality, strong Forest Plan in order to face real issues in the region.
Response: We believe that through this planning process the key issues for forest plan development at this time and place have been identified, and that the resulting plan presents strategies for their treatment. The degree of detail with which the revised forest plan treats these issues through allocation to prescriptions, standards and guidelines, goals and objectives and monitoring is intended to be at appropriate scales given the nature of the issues and affected resources. We think the revised forest plan is a high quality product, but at the same time is by no means perfect. We think that the forest planning process is continuous, and that amendments will be needed and welcome as new information is developed and new issues arise.

84. The Wasatch-Cache National Forest should remedy its failure to shift from emphasizing utilitarian values to ecosystem preservation and recreation values to mirror changes in society.
Response: We recognize the diverse opinions related to how the forest should be used. Different segments of society have different values and interests. Strong opinions are expressed by majorities or minorities, of the overall population, on various issues. However, the planning and NEPA process are not a referendum or vote, and we have no accurate information on the numbers of people who take up opposite positions on issues. The forest plan is a complex set of decisions intended to serve all of society, while protecting the values of the federal lands and their elements as required by law.

85. The Wasatch-Cache National Forest should use the precautionary principle in the final Forest Plan because of lack of species trend data.

Response: The FEIS has added analysis and information beyond what was provided in the DEIS. Consideration of lynx and other species is expanded in the FEIS. Additionally, Lynx Analysis Units (LAU) have been mapped and were considered along with other information on lynx in the FEIS. These LAU maps are on file with the forest. Some species of carnivores are not considered in as great detail (egg. pine marten and black bear) either because they are not at risk or their distribution is limited on the forest and local issues related to them are not critical. New information on individual species is presented in Appendix J – to the FEIS on Management Indicator Species. Information on presence/absence and some trend information are presented. Decisions in the forest planning process use the best information available.

86. The Wasatch-Cache National Forest should be proactive in addressing the immediate overuse problems facing the Tri-Canyon area and write a separate crisis plan for this area.

Response: Forest leadership and forest plan interdisciplinary team carefully considered a specific objective to plan focused on the Tri-Canyon area; see Forestwide Objective 19 in the Proposed Forest Plan (May 2001, pg. 4-20.) This objective did not survive in the revised forest plan given hard choices for where to emphasize future work. However, several identified objectives in the revised forest plan will add proactively to Tri-Canyon management, to bring vegetation within historic range of variation, to treat urban-interface fuels, to better manage dispersed camping, and to continue development of the Bonneville Shoreline and Great Western Trails. Also, considerable additional focused direction for the Tri-Canyon area in provided in the desired future conditions section on the Central Wasatch Management Area.

87. The Wasatch-Cache National Forest should write strict standards and guidelines specifically addressing the Tri-Canyon Forest in the new Forest Plan to avoid degradation from lack of management.

Response: The forest wide standards and guidelines for soil and watershed in the revised forest plan, the Clean Water Act, and state and county standards for water provide substantial limits on how much degradation is possible. We think that the Tri Canyon area, while directly adjacent to and used by a large urban population, can be protected adequately by these standards.

88. The Wasatch-Cache National Forest should frame management direction of the Logan Ranger District on watershed and critical wildlife corridor values in order to meet the purpose and need.

Response: Much of the desired future condition section for the Cache-Box Elder Management Area was developed with the protection of the Logan River watershed and north-south Bear River Range wildlife corridor in mind. See Watershed and Wildlife Habitat sections in that part of Chapter 4 in the revised Forest Plan.

89. The Wasatch-Cache National Forest should verify that final Forest Plan language reflects the management direction of the new Administration.
Response: The Wasatch-Cache National Forest and Intermountain Region receive direction and policy updates from our Forest Service Washington Office (WO) and the current administration on a regular basis. Draft forest planning documents are reviewed by the regional and WO prior to making a final decision, and forest policies must be compatible with direction from these management levels and the current administration.

Forest Plan Elements General

90. The Wasatch-Cache National Forest should clarify and strengthen vague direction in the proposed plan to reduce excessive management flexibility.
Response: The revised forest plan has tried to identify a trim and realistic set of management direction that can guide future management and set user expectations as to how management will operate. As the comment infers, some management flexibility and local ad hoc decision-making authority are recognized as essential to any organization that must plan project work, do daily work or respond to crises. The forest plan includes several kinds of management direction (DFCs, standards, guidelines, goals, objectives, and monitoring) all of which must be integrated and considered in implementing overall management for all or part of the forest. The revised forest plan sets standards where needed to protect key resources from overuse and so that desirable resource trends can be established. Standards that are perceived by some as tying the hands of local managers can be seen as excessive management flexibility to others.

91. The final Forest Plan should provide detailed descriptions of desired future conditions in order to meet ecosystem goals.
91.1 For each management area
91.2 For all habitat types and resources
Response: DFCs are written for each management area and forestwide for an array of resources and uses; see Chapter 4 in the revised Forest Plan. Similarly, the forestwide goals for different resources identify longer-term situations and settings that the plan intends to trend toward. Included in for the management area DFCs and in the goals are statements regarding uses, vegetation settings, wildlife habitats, watershed and soils, and other items.

92. The Wasatch-Cache National Forest should more effectively integrate desired future conditions for each resource to those for management areas as a whole.
Response: Desired future conditions (DFC) statements were written for management areas in the DEIS to apply to Alternative 6, and were rewritten as needed in the Final Plan. Forestwide resource DFCs were also rewritten as needed to make the whole plan more integrated. While management areas are not as large as the whole forest, they still are major tracts of the forest. Our rationale is that these management areas have some integrity from both social and physical geographic perspectives. The amount of detail and specific foci in a desired future

condition statement is related to several factors, some of which are: the decisions the forest plan is making, the issues for the management area and related larger and smaller contexts of consideration (forestwide or larger), scientific and management perspectives of the team writing the DFC. We recognize that the DFCs as written may seem like overkill to some (too narrowly defining of what may occur in an area), and lacking to others (not detailed enough regarding particular drainages, issues, development opportunities or prohibitions), both from social or physical/natural perspectives. We think, however, that the forestwide resource DFCs and management area DFCs provide enough emphasis on desired social and physical conditions related to the issues which need resolution, for managers and the public to see where management emphases for the planning period (next decade or more) should be. If more detailed definition of broad management is DFCs are needed, or if focus on subparts of the management area is needed, subsequent area assessments and planning may be undertaken.

93. The Wasatch-Cache National Forest should more effectively link desired future conditions to anticipated management actions by placing more focus on commodity resource values.

Response: The forest plan makes several decisions – desired future conditions, goals, objectives, standards, guidelines, management prescriptions, monitoring, timber allowable sale quantity, suitable rangelands, and makes recommendations for wilderness. The Forest Plan objectives stated in Chapter 4-A. 4 probably come closest to defining what management actions are likely to be taken in the near future. The forest plan is not required to provide detail on how these objectives or the other decisions will be implemented. In other words it states the "what and why" for the Wasatch-Cache over the next several years, but it does not state "how". "How" these several decisions will be implemented is largely left up to the discretion of the forest supervisor and district rangers as they propose projects, (subject to NEPA process and with public involvement) and undertake daily activities to narrow the gap between the current condition and what is desired in the future.

Alternative 5 in the FEIS was provided for the decision maker to consider one that would emphasize commodity outputs.

Goals and Objectives, Standards and Guidelines General

94. The Wasatch-Cache National Forest should add specific and measurable standards throughout the final Forest Plan to reduce excessive management flexibility.

Response: See response to 90.

95. The final Forest Plan should list prescription-specific standards and guidelines separately from forest-wide direction.

Response: In the revised Forest Plan prescription-specific standards and guidelines have been developed for timber harvest, prescribed fire, wildland fire use,

snowmobiling, livestock grazing, road, trail and recreation construction, and other activities. See Chapter 4 B- Forestwide Allocations, Management Prescription Categories.

96. The Wasatch-Cache National Forest should vary standards and guidelines by alternative and monitoring criteria.
Response: We chose to keep standards and guidelines constant across alternative for three reasons. First, we think of standards as thresholds beyond which there should not be further use, i.e. limits to reasonable use beyond which adverse effects are likely. As such, standards ought not to vary for soil compaction, vegetation loss, etc. – regardless of what general goals or desired futures there are for an area. Second, varying standards across alternatives would have made the analysis of alternatives even more complex than it has already become, without much perceived benefit. Third, keeping standards equal across alternatives allows standards to be a controlled constant across the analysis.

97. The Wasatch-Cache National Forest should change the frequency of visitor satisfaction surveys in Objective 23 to two-year intervals.
Response: The objectives in the revised Forest Plan have changed considerably since the DEIS and proposed Forest Plan were distributed in May 2001. Objective 23 has been dropped, and no other objective addresses frequency of visitor satisfaction surveys. The Forest Service has recently developed a national program for monitoring and sampling recreation use and satisfaction. The survey of Wasatch-Cache recreation will commence in the fall of 2002 and run for 1 year. Results of this yearlong survey should be available in early 2003. It is expected that this recreation survey will be conducted every five years to develop long-term information on recreation.

Management Prescription

Management Prescription Category Development General

98. The Wasatch-Cache National Forest should develop a broader range of management prescription categories to better manage individual activities to include a back-country designation.
Response: Management prescriptions 4.1 and 4.3 both can be considered "backcountry" recreation prescriptions. Management Prescription 4.1 is a non-motorized prescription, while the 4.3 prescription allows motorized use. For full descriptions on these management prescriptions see Chapter 4 in the revised Forest Plan.

99. The Wasatch-Cache National Forest should place the greatest emphasis on management prescriptions instead of management areas.
Response: Management prescription categories have been used by several regions in the Forest Service to generally describe what activities might occur or be limited on subareas of forests. They are a "shorthand" tool for looking at management for

delimited areas. The application of these prescriptions is a forest plan decision. Interpretation of how the prescription should be implemented through particular projects is specific to the site characteristics and local issues related to the implementation. Management prescriptions are only one part of overall plan direction, and should not be considered without also thinking about how standards and guidelines apply in the local setting, how the prescription relates to the goals and objectives of the plan and the desired future conditions for the management area. An analogy: Think of management prescriptions as a fork. It's hard to do a thorough and neat task of eating a meal (the forest) without also having a plate (management areas), spoon (goals and objectives), knife (standards and guidelines) and a napkin (monitoring.)

Management Prescriptions General

100. The Wasatch-Cache National Forest should eliminate the word "generally" from all management prescription category descriptions to reduce excessive management flexibility.
Response: We have eliminated the use of the word "generally" in our management prescription definitions to try to more clearly state what is allowed and what is not.

101. The Wasatch-Cache National Forest should reduce specificity in the management prescription categories to increase management flexibility.
Response: Management prescription definitions have been rewritten to clarify what is allowed and what is not. Prescriptions are applied to an area of land to better help the local manager and public understand what practices should be applied and what uses and characteristics can be expected on a given landscape. In the 1985 Forest Plan no prescriptions were applied, providing little, if any direction for how subareas of the forest ought to be managed. The application of management prescriptions helps define the future of an area, but still leaves considerable implementation flexibility available to the manager and to an involved citizenry.

102. The Wasatch-Cache National Forest should re-evaluate management prescription categories on a district-by district basis to enable maximum flexibility.
Response: We have reviewed management prescription on a district-by-district basis and believe that the range of alternatives, as cited in the FEIS, was sufficient to provide a high level of flexibility. The individual rangers and their staff also reviewed alternative 7. They believe that this alternative provides the flexibility they need to accomplish the Goals and Subgoals of the Forest Plan.

Allocation of Management Prescription Categories General

103. The Wasatch-Cache National Forest should avoid using restrictive management categories.
103.1 Wilderness
103.2 Unroaded, roadless, or non-motorized

Response: We understand that many users are not in favor of any protection of roadless values, non-motorized recreation, or wilderness recommendations on the Wasatch-Cache. Some alternatives provide for wilderness recommendations and maintenance of roadless values and others do not. No Wilderness is recommended in Alternatives 4 and 5. The discussion in Chapter 3, Topic 5 in the FEIS compares the extent to which roadless values are protected in each alternative. The decision-maker will have to weigh what is the best mix of winter motorized and non-motorized, protected roadless, and wilderness settings for the future.

104. The Wasatch-Cache National Forest should overcome the institutional bias against wilderness designation that is evident throughout the draft Forest Plan.
Response: The Forest Service must evaluate roadless areas for their Wilderness potential as required by laws and implementing direction. Public and internal opinions regarding the capability, availability, and need for more wilderness are weighed in the overall evaluation.

105. The Wasatch-Cache National Forest should redesign allocations on the North Slope to eliminate the patchwork of conflicting uses.
Response: Alternative 7 has been added to the array of alternatives after receiving comments on the DEIS. Other alternatives provide a range of possibilities designed to address the issues associated with this forest plan revision and guide the forest on different trajectories. What may appear in some alternatives to be a patchwork of conflicting uses to some is likely to be seen a good multiple-use programmatic direction to others. Projections of outputs from the different alternatives are provided that give a sense of what might be expected under management from the alternatives.

Implementation and Monitoring

Implementation and Monitoring General

106. The Wasatch-Cache National Forest should measure and report specific results toward Forest Plan goals.
Response: Forest plan monitoring is intended to show whether management under the plan is successfully moving the Wasatch-Cache closer toward the desired future conditions that are stated, or if there are problems. Our Chapter 5 section on Monitoring will focus on the extent to which the objectives identified in the forest plan are being accomplished, and whether that accomplishment is helping the forest trend as intended. Annual forest plan monitoring reports have been provided to the regional office. In the future some revamping of these of these reports is anticipated and they will be made available to the public on our website.

107. The final Forest Plan monitoring section should include specific standards to define success or failure for each measurement indicator.
Response: The forest plan monitoring section has been substantially changed since the publication of the DEIS and proposed Forest Plan in May 2001. In Chapter 5 of

the revised Forest Plan monitoring questions, measurement indicators, frequency of monitoring, and other monitoring criteria are identified. It is important that forest plan monitoring and project level monitoring be distinguishable. While there are clear relationships between the two, forest plan level monitoring is more programmatic and generally concerned with broader scale, while monitoring at project level is mostly likely more specific and focused.

108. The Wasatch-Cache National Forest should collect adequate monitoring data to meet cumulative effects analysis requirements.
Response: The choices made for monitoring items in the monitoring section are intended to provide a framework which can be further defined in response to changing conditions in annual monitoring and completed given available funding. Cumulative effects analysis in the FEIS is based on best available and applicable data at the time the document was prepared.

109. The Wasatch-Cache National Forest should incorporate the cost of monitoring into all projects or refuse to approve them if funding isn't available.
Response: We agree that project monitoring is an important responsibility, and its costs should be anticipated and budgeted during project development.

110. The Wasatch-Cache National Forest should monitor the same activities under different environmental conditions rather than just once.
Response: We do monitor BMPs and other indicators and standards under a broad variety of project situations. Part of our monitoring plan will be to sample a variety of projects in different areas of the forest to see if the forest is implementing direction as directed and trending as intended under the direction in the forest Plan. See the Monitoring section in Chapter 5 of the revised Forest Plan for details.

111. The Wasatch-Cache National Forest should monitor the extent to which standards and guidelines are applied annually.
Response: It is intended that all standards and guidelines are applied consistently. Many standards and guidelines are monitored annually, or regularly as implemented. Other forest plan monitoring and reporting are done at intervals of several years. Part of our monitoring plan will be to sample a variety of projects in different areas of the forest to see if the forest is implementing standards, guidelines, and other direction and trending as intended. The revised Forest Plan monitoring section in Chapter 5 details the frequencies of monitoring different items.

112. The final Forest Plan should better define how desired future conditions will be achieved and how monitoring will be done for the western Uintas.
Response: Chapter 4. A. 4. of the revised Forest Plan details several objectives in that will be undertaken over the course of the plan to move the forest toward DFCs. The detail for how these and other actions will be approached will be based on individual project proposals to implement the plan. Questions about how DFCs will be attained for vegetation, watershed, recreation, wildlife and other items defined in

the management area statements must be answered over time through project level implementation and monitoring both projects and overall performance under the plan.

Volunteers

113. The Wasatch-Cache National Forest should make better use of volunteer labor from recreationists.
113.1 Off-road vehicle users
113.2 Mountain Bikers
Response: The Wasatch-Cache does have an active program to incorporate volunteer work to enhance accomplishment of forest work. Volunteers have worked in recreation and trails projects, heritage resource (PIT) projects, range administration and monitoring, and a variety of other tasks. We welcome volunteers; their work takes time to supervise and coordinate, but it is of great value to us and worthy service to the community and for public lands. Volunteers may call the main desk at the Wasatch-Cache to inquire about opportunities.

114. The Wasatch-Cache National Forest should make better use of volunteer labor for monitoring non-recreational impacts.
Response: See response 113.

Funding and Fees

Funding

115. The Wasatch-Cache National Forest should secure adequate funding for certain purposes.
115.1 For the Avalanche Forecast Center
115.2 For environmental analysis
Response: Funding for a variety of functions that are closely linked to the Wasatch-Cache is often needed for their viability. Several partners including the Forest Service, Friends of Utah Avalanche Forecast Center, Utah State University, Salt Lake County, the State of Utah and others, fund the Utah Avalanche Center. Each of these partners recognizes the valuable service that is provided, and strives to apply support when at all possible.

Similarly, environmental analysis, in advance projects or planning, as required by law, is needed for quality work, and can take substantial funding to achieve. Often project proponents pay for environmental analysis, and partnering with other agencies to bear this cost is a good idea. The Forest Service is always looking for to bear the costs of project planning.

116. The Wasatch-Cache National Forest should increase funding for seasonal ranger positions to add weekend shifts and Spanish speaking rangers.
Response: Seasonal employees are a key to successful management of the forest. Funding for them is tight, and seems to be getting tighter as overhead costs go up. We do have Spanish-speaking seasonal employees working for us in recreation as well as other disciplines. These individuals are valued for their ability to communicate with the Spanish-speaking community and users. Hiring, deployment, and scheduling work for these individuals and other personnel actions are not part of forest plan decisions.

117. The Wasatch-Cache National Forest should consider the financial impacts of wilderness designation on the state parks and recreation division.
Response: To our knowledge, a decrease in licensing fees paid to a state for atvs and snowmobiles has not been linked to recommendations for wilderness in any state. In the State of Utah the numbers of these vehicles has continued to rise.

118. The Wasatch-Cache National Forest should use oil and gas revenue for road maintenance.
Response: Revenues from oil and gas development are committed to the treasury and to the states by laws, which define the mechanisms for their distribution and allocation. The Wasatch-Cache has no authority over how this is done.

119. The Wasatch-Cache National Forest should work with the State of Utah to assure that off-road vehicle gas tax receipts are used directly for off-road vehicle recreation.
Response: The Wasatch-Cache often applies for funding from the State of Utah to develop plans and funding for trails. The state has awarded monies nearly every year when the forest has projects that fall within their funding criteria. These monies are applied to both motorized and non-motorized recreation trails.

120. The final Forest Plan should identify specific funding sources to meet its recreational site maintenance goals.
Response: While general guidelines to seek partnerships or other means for funding or to decrease costs of administration, maintenance, operations, and monitoring may be appropriate in a forest plan, we think that identifying specific sources is not necessary and not within the scope of forest plan decisions.

121. The final Forest Plan should identify specific funding sources to meet its range monitoring requirements.
Response: See response 120.

122. The Wasatch-Cache National Forest should allocate money to monitor the use of wilderness areas.
Response: While budgets are always limited, some funding is spent each year to monitor wilderness use, both in the summer and winter. Additionally, a national visitor recreation use monitoring survey is being undertaken this year to improve

our understanding of recreation use on the forest (and in designated wildernesses.) Forest Plan level monitoring, see Chapter 5 of the revised Forest Plan, does identify questions that relate to recreation use and the extent of impacts to resources from recreation.

123. The Wasatch-Cache National Forest should require all individuals and corporations profiting from forest lands to pay the full cost for management associated with their use.
Response: Individuals and corporations that are permitted to operate on the national forest for profit are charged a use fee that is calculated based in part on the revenues of their operation. The agency is not required to cover the full costs of administration of the use, not would that always be desirable. Permit fees and administration are not within the scope of the decisions made in forest plan revision.

Fees

Fees General

124. The Wasatch-Cache National Forest should charge parking fees at lots.
Response: The forest could elect to charge for parking at developed lots, which provide some services or meet some minimum development levels. While this might be desirable and return some money to the treasury and the forest, it is not a forest plan decision.

125. The Wasatch-Cache National Forest should request a larger share of off-road vehicle registration fees for enforcement and mitigation.
125.1 Rather than new trail construction
Response: See response 119.

126. The Wasatch-Cache National Forest should address the fairness of imposing fees only on motorized recreationists.
Response: We recognize the frustration of some motorized recreation users, who feel they are bearing a larger burden because of licensing fees associated with their vehicles. However, the question of fees for parking or licensing is outside the scope of forest plan decisions.

127. The Wasatch-Cache National Forest should charge user fees according to the activity's impact.
Response: Fees for grazing use are set by Congress and changing them is not within the authority of the Wasatch-Cache National Forest. Mitigation of impacts can be required in definition and administration of permits.

Fee Demonstration Program

128. The Final EIS should disclose more detailed accounting information on fee demonstration program receipts and expenditures.
Response: Fee demo program decisions and the administration of the fee demo are not covered by the forest plan, and as such are not dealt with in this effects analysis or Forest Plan.

Detailed accounting for the fee demo program is provided on an annual basis, and reports are prepared which can be made available to the public. General summaries have been prepared for the Intermountain Region, and project by project reports are available on the forests.

129. The Final EIS should analyze the effects of the fee demonstration program on low-income users.
Response: See response 128.

130. The Wasatch-Cache National Forest should expand the fee demonstration program locally as long as subsidized grazing is eliminated.
Response: See response 128.

131. The Wasatch-Cache National Forest should only extend the fee demonstration program to heavily used areas.
Response: See response 128.

132. The Wasatch-Cache National Forest should require all users, including non-motorized ones, to pay a license fee.
Response: The establishment of use fees for areas or uses is not a decision that is within the scope of the issues related to this forest plan revision.

133. The Wasatch-Cache National Forest should revamp the fee demo program.
133.1 Establish a sliding fee scale for lower income people
133.2 Create one annual pass in partnership with adjacent forests
Response: See response 128.

134. The Wasatch-Cache National Forest should implement the proposed fee demo site at Mueller Park.
Response: See response 128.

135. The Wasatch-Cache National Forest should make Big and Little Cottonwood Canyons fee areas.
Response: See response 132.

136. The Wasatch-Cache National Forest should not use Mirror Lake Highway fee demo funds to harden impacted dispersed camping sites because it encourages further damage.

Response: The hardening of dispersed sites for resource protection or for recreation experience is a site-specific implementation decision that can be related to more general forest plan decisions (e.g. perhaps allocation of recreation management prescriptions or application of soil standards). Assessment of the relationship of damage, use, and local site conditions are all related to the side-specific condition of the case at hand and are not forest plan decisions. Paying for any hardening project can be done out of whatever funding is available and legal.

137. The Wasatch-Cache National Forest should exempt campers at developed sites from fee demo charges.
Response: See responses 128 and 132.

138. The Wasatch-Cache National Forest should eliminate the fee demonstration project.
Response: See response 128.

Tollbooths

139. The Wasatch-Cache National Forest should install tollbooths at Big and Little Cottonwood Canyons.
139.1 To improve public environmental sensitivity
139.2 To educate the public about watershed protection
139.3 To help control the litter epidemic
Response: Suggestions to increase sensitivity for environmental protection are valid and we believe education is a key element in an overall strategy for successful forest management. The Chapter 4 of the Forest Plan provides an objective that is specifically designed to deal with concerns regarding environmental sensitivity and enforcement, and several other objectives have public education elements within them. Tollbooths could be good contact points for dissemination of information about appropriate behavior on the forest. However, these are quite site-specific recommendations and are outside the scope of forest plan decisions.

140. The Wasatch-Cache National Forest should install tollbooths at Big and Little Cottonwood Canyons to be operated during the summer season.
140.1 With a special access pass for residents and employees
140.2 With a portion of each ski lift ticket contributed in the winter
Response: The recommendations are interesting but outside the scope of the forest plan decisions. These are site-specific and fee demo or cost recovery suggestions that are handled under different authorities and decisions.

141. The Wasatch-Cache National Forest should redesign the tollbooth at Mirror Lake Highway to improve enforcement of the user fees.
Response: See responses 139 and 140.

Alternatives

Alternative Development

Range of Alternatives

142. The Wasatch-Cache National Forest should provide an adequate range of alternatives.
Response: The 7 Alternatives presented in this FEIS encompass a spectrum of approaches to resolving issues and needs for change topics identified through public involvement and environmental analysis during the Forest Plan revision process. Between Draft and Final, several changes were made to Alternatives in response to public comments. These are described in the FEIS section titled "Alternative Development, Range of Alternatives" in Chapter 2.

142.1 By including an alternative that emphasizes multiple use.
Response: All Alternatives in this FEIS are consistent with the Multiple Use Sustained Yield Act. FEIS Appendix D-1 includes an explanation of how Management Prescriptions applied to all Alternatives are consistent with Multiple-Use and other laws. However, that Act allows for broad discretion and there is a wide range of opinions about that mix of goods and services constitute "multiple use". The 7 Alternatives in this FEIS represent that range.

142.2 By including an alternative that emphasizes scientific management.
Response: The analysis of environmental effects provided in FEIS Chapter 3 provides disclosure of the projected results of implementing each of the 7 Alternatives based on the best available science. Each of the Alternatives provides for a different combination of constraints and management of resources that respond to both scientific and social concerns. There is a wide range of opinions about what would constitute scientific management. With regard to withdrawing inventoried roadless areas from harvest, FEIS Appendix CII provides an evaluation of values of each inventoried roadless area. Alternative 7 was designed to take these values into account when applying management prescriptions in contrast to Alternatives 1,3,and 6 that apply the Roadless Area Conservation Rule.

142.3 By including a balanced range of non-motorized winter recreation designations.
Response: The range of alternatives for non-motorized winter recreation is displayed in this FEIS in Chapter 3 under Topic 4, Table REC-12. The relative percentages of non-motorized winter opportunity are based on mapping of specific areas for non-motorized winter uses considering accessibility as well as incorporating decisions made through wilderness designation. The Alternatives respond to specific comments about particular areas for non-motorized use in winter rather than on a mathematically even spread of acres among alternatives.

142.4 By including an alternative that further restricts motorized access.
Response: The decision not to entertain site-specific changes to existing Travel Management Plans for summer is explained in the FEIS, Chapter 2, under the section titled "Alternatives Considered but Eliminated From Detailed Study". This decision is within the discretion of the Forest Supervisor (36 CFR 219.12(b)). However concerns raised between Draft and Final about the implications of Recreation Opportunity Spectrum Mapping for future Travel Management Planning have now been addressed through clarifying language added in FEIS Chapter 2, Common Characteristics of Alternatives, Appendix D, and in the Revised Forest Plan Chapter 4.

142.5 By including an alternative that has no roadless or non-motorized Designations.
Response: Update of the roadless area inventory and evaluation of roadless areas for potential wilderness recommendation are required components of Forest Plan Revision (36 CFR 219.17(a)). Alternatives 4 and 5 recommend no roadless areas for wilderness, which would add to non-motorized acres

142.6 By including an alternative that recommends all roadless areas as wilderness.
Response: This was not considered to be reasonable because not all inventoried roadless areas have high quality wilderness characteristics. FEIS Appendix CI provides an evaluation of each roadless area for wilderness recommendation.

142.7 By including a wide range of alternatives for wilderness recommendation.
Response: The FEIS range of Alternatives includes from 0 to 388,900 acres of recommended wilderness or 0 to 64% of inventoried roadless areas. Several areas were added to recommended wilderness in Alternative 1 in response to public comment about specific roadless areas with high quality wilderness characteristics. Given that not every inventoried roadless area has these characteristics, the range of reasonable alternatives area provided. FEIS Appendix CI provides an evaluation of each roadless area for wilderness recommendation.

142.8 By including an alternative that eliminates timber harvesting and grazing.
Response: FEIS Alternative 1 eliminates timber harvesting. Elimination of grazing was not included for reasons explained in FEIS, Chapter 2 under the heading "Alternatives Considered But Eliminated From Detailed Study."

142.9 By including a full range of alternatives for grazing.
Response: We have added additional suitability criteria in Alternative 2 to be responsive to the concern about the range of alternatives for grazing. See FEIS Chapter 2, Alternative 2 and Comparison of Alternatives.

142.10 By including alternatives indicating reductions in animal unit months to reflect current demand.
Response: The FEIS provides a discussion of animal unit months and demand variables in Chapter 3, Topic 7, under the heading "Livestock Grazing Levels".

142.11 By maintaining the current range of alternatives for grazing.
Response: See Response 142.9.

142.12 By including an alternative with large carnivores as management indicator species.
Response: FEIS Chapter 2 under the heading "Alternatives Considered but Eliminated From Detailed Study" provides a discussion of the appropriateness of large carnivores as MIS. FEIS Chapter 3, Topic 2, Wildlife provides a discussion of MIS and why they were selected.

142.13 By including an alternative that protects biodiversity and emphasizes ecosystem services.
Response: Within the range of reasonable alternatives, Alternatives 1 and 2 were designed to emphasize protection of biodiversity and ecosystem services such as clean water, air and diverse habitats.

Adequacy of Alternatives

143. The Wasatch-Cache National Forest should reject all six alternatives until it provides further guidelines defining financial, social, and access impacts.
Response: The FEIS displays the expected effects of 7 Alternatives including social, economic and access. See Chapter 2 Comparison of Alternatives, Chapter 3, Topic 3 Roads Access Management, and Social and Economic Analysis.

144. The Wasatch-Cache National Forest should revise alternatives to more adequately plan for an increase in off road vehicle use and associated impacts.
Response: The Revised Forest Plan includes Objectives for OHV and Non-Motorized Travel Management as well as for Education and Enforcement. Also See Response 142.4

145. The Wasatch-Cache National Forest should eliminate Alternatives 1 and 5 because both are too extreme to be acceptable
Response: While some may view Alternatives 1 and 5 as extreme, they were developed in direct response to public comment and provide for disclosure of effects for a range of reasonable alternatives as required under NEPA. Selection of Alternative 7 reflects the Forest Service desire to provide for some balance between these ends of the spectrum.

Comparison of Alternatives

146. The Wasatch-Cache National Forest should compare the effectiveness of Alternatives 1 and 6 in meeting stated goals for preserving ecosystem values and wildlife.

146.1 With respect to management prescriptions.
Response: FEIS Chapter 3, Topic 2, Wildlife provides *improved* information on the effects of each of the Alternatives, their mapped management prescriptions, and the allowed activities on groups of wildlife species. Effects on ecosystem values for each Alternative are displayed in FEIS Chapter 3, Topic 1, Watershed Health and Topic 2, Vegetation. Table VEG-7 summarizes how each of the 7 alternatives affects ecosystems in terms of properly functioning conditions. The Record of Decision explains why Alternative 7 was selected given its relative effects on ecosystem values and wildlife.

146.2 With respect to motorized recreation.
Response: Each of the 7 Alternatives in the FEIS provides for a different mix of uses and protections. FEIS Chapter 3, Topics outlined above in Response 146.1 provide disclosure of effects of motorized recreation on ecosystem values and wildlife. The Record of Decision explains why Alternative 7 was selected given its' relative effects on ecosystem values and wildlife.

146.3 With respect to winter recreation.
Response 146.3: See Response 146.2

146.4 With respect to scenic quality.
Response: FEIS Chapter 3, Topic 4, Scenery Management includes a display of differences between the 7 Alternatives with regard to scenic integrity.

146.5 With respect to ecosystem protection.
Response: See Response 146.1

147. The Wasatch-Cache National Forest should compare the alternatives with respect to risk of uncharacteristic wildfire, insects, and disease.
Response: FEIS Chapter 3, Topic 2, Vegetation under the headings "Effects on Vegetation Communities from Fire Management" and "Effects on Vegetation Communities from Insects, Disease, and Noxious Weeds" provide an improved discussion of the effects of the 7 Alternatives with respect to these topics. FEIS Appendix B-1 includes a discussion of vegetation modeling used to compare results of alternatives on factors influencing wildfire, insects, and disease.

148. The Wasatch-Cache National Forest should provide resource outputs for each alternative.
Response: The DEIS clearly displayed outputs in DEIS Chapter 2, Comparison of Alternatives, Table 2-2. Again, in FEIS Chapter 2, Comparison of Alternatives, Table 2-2 shows projections of outputs for each alternative.

149. The Wasatch-Cache National Forest should compare the alternatives with respect to forest health.
Response: The best approximation of this comparison is provided in the FEIS, Chapter 3, topic 2 vegetation, table VEG-7.

150. The Wasatch-Cache National Forest should explain why Taylor Canyon is better protected under Alternative 5 than under Alternative 6.
Response: This question resulted in clarification of the intent of management prescriptions for watershed emphasis (3.1 and 3.2). The management prescription applied to Taylor Canyon in Alternative 7 protects Taylor Canyon by not allowing road construction.

Suggestions for New Alternatives

151. The Wasatch-Cache National Forest should evaluate new alternatives. The CUFF Alternative.
Response: We believe within the range of the 7 Alternatives presented in this FEIS, most of the CUFF Alternative components are included and analyzed. Alternative 5 includes the suggested prescriptions for suitable timber that ignore inventoried roadless areas and allow range and timber production on the same areas. Alternatives 2-7 allow timber harvest in prescription category 8. All Alternatives make varying degrees of use of prescription 3.2 and 5.1, which are similar to the CUFF suggested 5.3. Concerns about big game winter range are addressed through both management prescriptions 3.2 and through winter recreation mapping. Visual Quality is addressed in all Alternatives through the Scenery Management System. The exception is that none of the 7 Alternatives allow for summer cross-country motorized travel (CUFF prescription 4.3.1). In the State of Utah, summer motorized travel is legal only on routes and areas designated as such.

151.1 The Balanced Alternative (Alternative 7).
Response: We believe within the range of the 7 Alternatives presented in this FEIS, the Balanced Alternative components are included and analyzed. Some are adopted in Alternative 7. Since the Balanced Alternative starts with Alternative 5 and adjusts it to incorporate aspects of other Alternatives (such as the commercial timber harvest more like Alternative 4, grazing at current levels like Alternative 3, watershed protection that is more like Alternative 6, and winter motorized area similar to the current Travel Plan for Logan Ranger District like in Alternative 3), the analysis has provided for disclosure of effects similar to those of the Balanced Alternative. Increased potential for summer motorized trails on the east half of the Bear River Range is incorporated into Alternative 7 through management prescriptions that allow new trail construction as well as clarification of the relationship between ROS and future Travel Management Planning. Alternative 3 applies the suggested 5.1/6.1 Prescription to the Gibson and Swan Creek IRA's. Portions of the specific suggestions for the Mount Naomi IRA are encompassed by the 7 Alternatives in the FEIS however none are exactly as suggested. Alternative 7

uses 2.6 rather than the suggested 3.1, providing additional protection of watershed and roadless area values. Alternative 3 uses 6.1 for a portion though not all of the area consistent with this suggestion. Alternative 3 applies a 3.2 rather than the suggested 3.1 to Mount Logan North IRA but these prescriptions have identical allowed activities in this Alternative. Alternatives 2, 3, 6, and 7 apply the suggested 3.2 to the Mount Logan West IRA. Alternatives 2 and 6 apply the suggested 3.1 to portions of the Mount Logan South IRA, Alternative 7 applies 3.1 as suggested, and Alternatives 3 and 6 apply the suggested 5.1/6.1 to at least part of the remainder of these areas although not the entire area. There are a very large number of combinations of alternative prescription arrangements possible. The range of the 7 Alternatives analyzed in the FEIS provides for disclosure of the spectrum, although not all potential prescription combinations, of options for each roadless area.

151.2 To create a travel plan alternative.
Response: The FEIS includes a range of reasonable alternatives developed in response to issues and public comments on Forest Plan revision. Travel Management Planning is recognized as an important component of forest management and existing Travel Management Plans were assumed to be adequate as a baseline for summer travel opportunities in all Alternatives. The Revised Forest Plan includes an Objective to address needs for inventorying current trail opportunities and completing a roads analysis for maintenance levels 1 and 2 roads as well as updating the Salt Lake, Ogden, and Logan Ranger District summer Travel Management Plans. Reasons for not analyzing site-specific Travel Management decisions within Forest Plan revision analysis are explained in FEIS Chapter 2 under the heading "Alternatives Considered But Not Analyzed in Detail."

152. The Wasatch-Cache National Forest should create a combined alternative of 1, 2, and 6, with overall zoning closer to Alternative 1 to ensure appropriate wilderness protection.
Response: We believe the range of 7 Alternatives analyzed in this FEIS provides for a reasonable number of examples covering the full spectrum of options for wilderness protection.

Alternatives Considered in Detail

Alternative 1

Select Alternative 1

153. The Wasatch-Cache National Forest should select Alternative 1
153.1 Because it emphasizes wilderness protection
153.2 Because it protects habitat
153.3 Because it reduces motorized recreation
153.4 Because it preserves recreational opportunities
153.5 Because it protects the environment
153.6 Because it prohibits other development

Response: Thank you for expressing your views on this Alternative. All views were carefully considered during development and evaluation of the existing Alternatives.

154. The Wasatch-Cache National Forest should select Alternative 1 as the Preferred Alternative.
Response: See Response 153.

Do Not Select Alternative 1

155. The Wasatch-Cache National Forest should not select Alternative 1.
155.1 Because it restricts recreational opportunity
155.2 Because it promotes wilderness above other uses
155.3 Because it restricts use
155.4 Because it harms wildlife habitat
Response: See Response 153.

Modify Alternative 1

156. The Wasatch-Cache National Forest should modify Alternative 1.
156.1 To allow management
Response: We agreed that Alternative 1 should be clarified to include active rehabilitation of areas damaged by recreation or other uses. The description of this Alternative in FEIS Chapter 2 has been modified and effects of this Alternative discussed in FEIS Chapter 3 have been adjusted accordingly.
156.2 To allow heli-skiing
Response: There is an infinite combination of Alternative elements possible. The FEIS includes 7 Alternatives, 4 of which allow heli-skiing. Given the extent of recommended wilderness in the Central Wasatch for Alternative 1, the addition of heli-skiing to this alternative would be incompatible.

Alternative 2

Select Alternative 2

157. The Wasatch-Cache National Forest should select Alternative 2
157.1 Because it is a fair compromise
157.2 Because it preserves the land
157.3 Because it protects the environment
157.4 Because it has the least impact on air quality
157.5 Because there are already enough roads on the forest
Response: See Response 153.

Do Not Select Alternative 2

158. The Wasatch-Cache National Forest should not select Alternative 2.
158.1 Because it restricts recreational opportunities
158.2 Because it promotes wilderness above other use
158.3 Because it harms wildlife habitat
Response: See Response 153.

Modify Alternative 2

159. The Wasatch-Cache National Forest should modify Alternative 2 to address motorized uses of the forest.
Response: There is an infinite combination of Alternative elements possible. The FEIS includes 7 Alternatives, each with different approaches to motorized uses. We believe the range of 7 Alternatives analyzed in this FEIS provides for a reasonable number of examples covering the full spectrum of options for motorized uses of the forest.

Alternative 3

Select Alternative 3

160. The Wasatch-Cache National Forest should select Alternative 3 because it is well balanced
Response: See Response 153.

161. The Wasatch-Cache National Forest should select Alternative 3 as the Preferred Alternative.
Response: See Response 153.

Do Not Select Alternative 3

162. The Wasatch-Cache National Forest should not select Alternative 3.
Response: See Response 153.

Alternative 4

Select Alternative 4

163. The Wasatch-Cache National Forest should select Alternative 4.
163.1 Because it maintains existing uses
163.2 Because it is a fair compromise
Response: See Response 153.

Alternative 5

Select Alternative 5

164. The Wasatch-Cache National Forest should select Alternative 5.
164.1 Because it is well balanced
164.2 Because it has wide public support
164.3 Because it preserves recreational access
164.4 Because it allows active management
164.5 Because it allows local control
164.6 Because it maintains existing uses
164.7 Because it allows for conversion of natural resources into commodities
164.8 Because it allows needed flexibility in timber management
164.9 Because it preserves social values
164.10 Because more wilderness is not needed
164.11 Because it will allow ski area expansion
164.12 As long as it does not interfere with the growth of vegetation
Response: See Response 153.

165. The Wasatch-Cache National Forest should select Alternative 5 as the Preferred Alternative.
Response: See Response 153.

Do Not Select Alternative 5

166. The Wasatch-Cache National Forest should not select Alternative 5.
166.1 Because it allows too much off-road vehicle abuse
166.2 Because it allows too much development
Response: See Response 153.

Modify Alternative 5

167. The Wasatch-Cache National Forest should modify Alternative 5.
167.1 To add the big game closure between Little Bear/Logan Canyon Face and Right hand Fork
167.2 To reduce timber harvest outputs
167.3 To more adequately address extractive activities, restoration, and monitoring
167.4 To coincide with the travel plan
Response: The range of Alternatives analyzed in this FEIS includes each of the suggested components. Since there are an infinite number of combinations of alternative elements that could be analyzed, the FEIS includes a spectrum to disclose the differences in potential effects. Alternative 7 was developed with careful consideration of suggestions for modifications to the 6 Alternatives presented in the DEIS.

Alternative 6, The Preferred Alternative

Select Alternative 6

168. The Wasatch-Cache National Forest should select Alternative 6.
168.1 Because it is a fair compromise
168.2 Because it protects recreational opportunities
168.3 Because it preserves heli-skiing
168.4 Because it protects the environment
Response: See Response 153

Do Not Select Alternative 6

169. The Wasatch-Cache National Forest should not select Alternative 6.
169.1 Because it will reduce funding
169.2 Because it will reduce motorized recreation opportunities
169.3 Because it will reduce timber harvesting
169.4 Because it leans too far toward extreme preservation
Response: See Response 153

Modify Alternative 6

170. The Wasatch-Cache National Forest should modify Alternative 6.
170.1 To more adequately protect the environment
170.2 To protect wildlife corridors
170.3 To protect Canadian lynx habitat
170.4 To address carbon sequestration
170.5 To increase recommended wilderness
170.6 To include the High Uinta Roadless Area in proposed wilderness designations
170.7 To preserve motorized recreation opportunities
170.8 To address recreational conflicts
170.9 To create less restrictions
Response: See Response 167.

Forest Plan Direction

Management Prescription Categories

Management Prescription Category Allocations General

171. The Wasatch-Cache National Forest should provide a more equitable distribution of acres by management prescription categories.
Response: The seven alternatives in the FEIS provide a range of management prescription category distributions across the landscapes of the WCNF. The prescriptions were mapped based on both the capabilitiy and sensitivity of the land

and the approach of the particular alternative toward resolving the issues identified. See Table 2-1 in FEIS Chapter 2 Comparison of Alternatives to review the range of prescription assignments.

172. The Wasatch-Cache National Forest should allocate acreage in inverse proportion to the degree of impact of each activity using a rating scale based on impacts.
Response: Alternative 1 provides a distribution of management prescriptions that comes closest to accomplishing this suggestion since it places the most acres under the most restrictive prescriptions. See Comparison of Alternatives, FEIS Chapter 2.

173. The Wasatch-Cache National Forest should default to Management Prescription Categories 5.1/6.1 in roadless areas.
Response: Prescriptions were mapped for each alternative based on the capabilities and sensitivities of the land along with the approach of the particular alternative for resolving the identified issues. Alternative 3 has the highest acreage of these prescriptions although it does not specifically target roadless areas. Acres of Prescriptions applied to each roadless area are displayed in FEIS Appendix C2.

174. The Wasatch-Cache National Forest should designate more areas to Management Prescription Category 1.5 or 2.6 to protect values associated with undeveloped areas.
Response: Alternative 1 is the alternative that prescribes 1.5 and 2.6 for the most acreage of any alternative and effects of this are disclosed in Chapter 3 of the FEIS.

175. The Wasatch-Cache National Forest should apply the protections of Management Prescription Category 3.0 to all areas of the forest to protect habitats and watersheds.
Response: Prescriptions were mapped for each alternative based on the capabilities and sensitivities of the land along with the approach of the particular alternative for resolving the identified issues. Alternatives 6 and 7 apply 3 prescriptions to the most acres among the alternatives presented in the FEIS and effects of these are disclosed in FEIS Chapter 3. To apply these prescriptions to the entire forest would not provide for resolution of some of the issues identified and therefore an alternative that did this was not analyzed in detail. Emphasis of other prescriptions was needed to provide a balance across the Forest.

176. The final Forest Plan should clarify that the AHWE management prescription category does not apply to private inholdings.
Response: The Revised Forest Plan management prescriptions do not apply to private inholdings. Non-National Forest lands are shown in gray on maps and discussed under management prescription 7 in the Revised Forest Plan.

Modifications to Management Prescription Categories

177. The final Forest Plan should eliminate the differential management prescription category activities permitted in inventoried roadless versus non-roadless areas.
Response: Alternative 7 does this.

178. The Wasatch-Cache National Forest should adjust allowed motorized activities in different management prescription categories.
Response: Although some of the prescriptions that are focused on recreation do have a motorized or non-motorized emphasis, the majority of this is determined and displayed based on Travel Mangement Plans, and Recreation Opportunity Class Mapping for both winter and summer. The prescription maps do not address motorized/non-motorized activities.

179. The Wasatch-Cache National Forest should prohibit grazing in Management Prescription Category 3 where there is a gross negative impact.
Response 179: Capability and Suitability for livestock grazing is based on criteria described in FEIS Appendix B9. The only Prescription that inherently is classified as not suited for livestock grazing is 2.4 Research Natural Areas. Specific areas of land that are in unsatisfactory condition were removed from the suitable for grazing land base in Alternatives 1,2,6, and 7. These lands occur in Prescription Category 3 as well as other prescriptions so there was no way to tie suitability based on this criterion directly to a Prescription Category. The remainder of the Allotments in which these unsatisfactory condition lands occur is still classified as suitable for livestock grazing.

180. The Wasatch-Cache National Forest should omit the word "generally" from Management Prescription Category 4.2. with regard to non-motorized emphasis.
Response: This has been done.

181. The Wasatch-Cache National Forest should clarify what is permitted under management prescription categories.
Response: In the Revised Forest Plan, Chapter 4.A.5 Management Prescriptions have been edited for clarity and Standards and Guidelines have been added to clarify the intentions for each of the allowed activities.

182. The Wasatch-Cache National Forest should redefine Management Prescription Categories 3.1 and 3.2.
Response: The request to redefine these Categories so that they prohibit road construction, motorized recreation, and recreational development is already displayed and analyzed in the FEIS in Alternatives 1,2,3, and 6. In Alternative 7, Category 3 Prescriptions have been further subdivided to include areas where these activities are allowed and not allowed. See FEIS Chapter 2 Alternatives and Allowed Activities Tables.

183. The Wasatch-Cache National Forest should clarify the status of Management Prescription Category 7.0.
Response: The status of Prescription Category 7 is explained and clarified in the Revised Forest Plan Chapter 4.A.5.

184. The Wasatch-Cache National Forest should define the difference between Management Prescription Categories 2.6 and 4.1.
Response: The Revised Forest Plan provides descriptions of these Prescription Categories in Chapter 4.A.5. Key differences are now highlighted with standards and guidelines. 2.6 does not allow vegetation/fuel treatments nor new trail construction, but does allow summer motorized recreation on designated routes while 4.1 does allow vegetation/fuel treatment, and new trail construction, but does not allow summer motorized recreation.

Management Prescription Category Allocations – Roadless/Proposed Wilderness Areas

185. The Wasatch-Cache National Forest should assign more protective management prescription categories to all roadless acres.
185.1 By utilizing Management Prescription Category 2.6
185.2 By utilizing Management Prescription Categories 1.5 or 2.6.
185.3 By utilizing Management Prescription Categories 2.4-2.7
185.4 By utilizing Management Prescription Categories 2.6 or 4.1
Response: FEIS Chapter 3, Topic 5, under the heading "Management Prescriptions and effects on roadless values" provides an evaluation of the degree to which roadless areas are protected by alternative through assignment of Prescription Categories- see Table RW-9. The range of alternatives evaluated each provide varying degrees of protection.

186. The Wasatch-Cache National Forest should use non-timber yielding management prescription categories in roadless areas.
Response: Alternatives 1,2, and 6 do not allow timber harvest in roadless areas.

Management Prescription Category Allocations – Site-Specific Requests

Cache Box Elder Management Area

187. The Wasatch-Cache National Forest should change the proposed management prescription categories for Water Canyon to Management Prescription Category 1.5.
Response: See response 188.

188. The Wasatch-Cache National Forest should change the proposed management prescription categories for Green Canyon to Management Prescription Category 1.1 or 1.2

Response: Alternative 1 places the 1.5 prescription in Green Canyon (except the canyon bottom which is not qualified for Wilderness because of water development). Categories 1.1 and 1.2 are only applied to already Congressionally designated wildernesses not areas being recommended.

189. The Wasatch-Cache National Forest should change the boundary of Management Prescription Category 4.3 in Green Canyon.
Response: The boundary of this prescription was placed specifically to incorporate the recreational uses there now with the remainder of the area emphasizing watershed (3.1). Should the proposed development take place in the mouth of the canyon and dispersed camping discontinued in the upper portion, the prescription map could be changed and the Forest Plan amended to reflect that site-specific decision.

190. The Wasatch-Cache National Forest should change the proposed management prescription categories in Mount Naomi Wilderness to Management Prescription Category 1.1
Response: Category 1.1 is by definition an "unmodified natural environment". Alternatives 1,2,3, and 5 show all areas within Mount Naomi Wilderness except existing trails (which cannot qualify as 1.1) as a 1.1 Prescription.

191. The Wasatch-Cache National Forest should change management direction for the Mount Naomi Inventoried Roadless Area.
Response: Portions of the specific suggestions for this IRA are encompassed by the 7 Alternatives in the FEIS however none are exactly as suggested. Alternative 7 uses 2.6 rather than the suggested 3.1, providing additional protection of not only watershed but roadless area values. Alternative 3 uses 6.1 for a portion though not all of the area consistent with this suggestion. There are an very large number of combinations of alternative prescription arrangements possible. The range of the 7 Alternatives analyzed in the FEIS provides for disclosure of the spectrum, although not all potential prescription combinations, of options for this roadless area.

192. The Wasatch-Cache National Forest should implement proposed management prescription categories for the Mount Naomi area by Utilizing Management Prescription Category 2.6
Response: Alternative 7 does this.

193. The Wasatch-Cache National Forest should change the proposed management prescription categories for the Mount Naomi area.
193.1 To Management Prescription Category 1.5
193.2 To Management Prescription Category 4.1
Response: Alternatives 1,4, and 3 apply these Prescriptions and disclose the effects of this on the Mount Naomi roadless area.

194. The Wasatch-Cache National Forest should adopt the management prescription categories proposed in Alternative 1 for the Logan Canyon and Mount Naomi areas.
Response: See Response 153.

195. The Wasatch-Cache National Forest should change the proposed management prescription categories for the area surrounding White Pine Lake to Management Prescription Category 1.5
Response: Alternative 1 does this and discloses the effects.

196. The Wasatch-Cache National Forest should change management direction for the Gibson Inventoried Roadless Area.
Response: Alternative 3 applies the suggested 5.1/6.1 Prescription to this area. This allows for the suggested roading, timber harvest, and trail construction. All alternatives allow for road reconstruction/realignment to reduce resource impacts. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning.

197. The Wasatch-Cache National Forest should change management direction for the Temple Peak Inventoried Roadless Area.
Response: Alternative 5 applies the suggested 5.2/6.2 Prescription to this area. This allows for the suggested roading, timber harvest, and trail construction. All alternatives allow for road reconstruction/realignment to reduce resource impacts. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning. The suggestion for winter motorized is displayed in Alternative 3.

198. The Wasatch-Cache National Forest should change management direction for the Right Hand Fork Logan Inventoried Roadless Area.
Response: Alternative 3 applies the suggested 5.1/6.1 Prescription to this area, which also allows for the suggested roading, timber harvest, and trail construction. All alternatives allow for road reconstruction/realignment to reduce resource impacts. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning. The suggestion for winter motorized is displayed in Alternatives 3 and 5.

199. The Wasatch-Cache National Forest should implement proposed management prescription categories in the Mount Logan area by utilizing Management Prescription Categories 3.1/3.2
Response: Alternative 7 does this.

200. The Wasatch-Cache National Forest should change management direction for the Mount Logan (West) Inventoried Roadless Area.
Response: Alternatives 3 and 7 apply the suggested 3.2 Prescription and ROS of SPNM; however, neither allows for the suggested timber harvest and roading. Alternatives 4 and 5 apply prescriptions that allow these. All alternatives allow for road reconstruction/realignment to reduce resource impacts.

201. The Wasatch-Cache National Forest should change management direction for the Mount Logan (South) Inventoried Roadless Area.
Response: Alternative 3 applies the suggested 3.2 Prescription and Alternatives 4 and 5 apply a 6.2 (rather than 5.1/6.1) providing for a spectrum of options in this area though not exactly the Prescriptions suggested. This spectrum allows for the suggested roading and timber harvest. All alternatives allow for road reconstruction/realignment to reduce resource impacts. Suggested ROS is partially though not entirely encompasses by Alternatives 5 and 7. New trail construction is allowed in Alternatives 7,6,5, and 4. Additional suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning. The suggestion for winter motorized is displayed in Alternative 3.

202. The Wasatch-Cache National Forest should change the proposed management prescription categories in Logan Canyon.
202.1 To Management Prescription Category 1.5
Response: Alternatives 1 and 2 display this option for the area.

202.2 To a 3.x Management Prescription Category
Response: None of the Alternatives apply the suggested Prescription to this area although the 2.6 Prescription applied in Alternative 7 provides for the watershed protection but with less flexibility than a 3.0 Prescription and more than the 1.5 from which the respondent wanted to see a change.

203. The Wasatch-Cache National Forest should change management direction for the Mahogany Range Inventoried Roadless Area.
Response: Alternatives 3,6, and 7 apply the suggested 3.2 Prescription to this area however these Alternatives do not allow for the suggested roading and timber harvest. Alternatives 4 and 5 apply prescriptions that do allow for these activities. All alternatives allow for road reconstruction/realignment to reduce resource impacts. None of the Alternatives has this area as SPM for summer but Alternative 4 does apply Roaded Natural. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning. The suggested Winter Non-motorized class is applied to this area in Alternatives 1,2,6, and7.

204. The Wasatch-Cache National Forest should change management direction for the Boulder Mountain Inventoried Roadless Area.
Response: Alternatives 4 and 5 apply the suggested 5.2/6/2 Prescription to this area allowing the suggested roading, timber harvest, and new trail construction. All alternatives allow for road reconstruction/realignment to reduce resource impacts. None of the Alternatives has this entire area as SPM for summer but Alternative 4 does apply Roaded Natural. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning. Alternatives 3,4,5,6 and 7 apply the suggested Winter Motorized class to this area.

205. The Wasatch-Cache National Forest should implement proposed management prescription categories south of Hardware Ranch.
205.1 By utilizing Management Prescription Category 2.4
205.2 By utilizing Management Prescription Category 3.1/3.2
Response: Thank you for expressing your views in support of these Prescriptions applied in this area in DEIS Alternative 6. All views were carefully considered during development and evaluation of the existing Alternatives.

206. The Wasatch-Cache National Forest should implement proposed management prescription categories in the Wellsville Mountains by utilizing Management Prescription Category 3.2.
Response: Thank you for expressing your views in support of this Prescription applied to this area in DEIS Alternative 6. All views were carefully considered during development and evaluation of the existing Alternatives.

207. The Wasatch-Cache National Forest should change the proposed management prescription categories in the Wellsville Mountains to Management Prescription Category 1.5
Response: Alternative 1 applies Prescription 1.5 to the suggested parcel at the northern end of the Wellsville Mountains. Either this or the 3.2 applied in other alternatives can provide needed spring protection for wildlife.

208. The Wasatch-Cache National Forest should implement proposed management prescription categories for the Northern Central Bear River Range by utilizing Management Prescription Category 3.2
Response: Thank you for expressing your views in support of this Prescription applied to this area in DEIS Alternative 6. All views were carefully considered during evaluation of the existing Alternatives and development of Alternative 7.

209. The Wasatch-Cache National Forest should change the proposed management prescription categories for the Northern Central Bear River Range to Management Prescription Categories 3.1 and 2.1-2.3
Response: FEIS Alternative 7 applies Prescription 3.1A to all streams with known populations of Bonneville Cutthroat Trout. Suggested Prescriptions 2.1-2.3 have not been applied to the Wasatch-Cache National Forest at this time because no

suitability determination has been completed for Wild and Scenic River designation. Beaver Creek was found eligible in the inventory but until such time as a suitability analysis is completed, the Wild and Scenic Prescriptions will not be applied.

210. The Wasatch-Cache National Forest should implement proposed management prescription categories on the Mid Bear River Range.
210.1 By utilizing Management Prescription Category 3.1/3.2
210.2 By utilizing Management Prescription Category 2.5
Response: Thank you for expressing your views in support of these Prescriptions applied to these areas in DEIS Alternative 6. All views were carefully considered during evaluation of the existing Alternatives and development of Alternative 7.

211. The Wasatch-Cache National Forest should change the proposed management prescription categories on the Mid Bear River Range to Management Prescription Category 3.1/3.2.
Response: Alternative 2 applies the suggested Prescriptions to this area displaying the effects of this option in the FEIS.

212. The Wasatch-Cache National Forest should change the proposed management prescription categories in Dry Canyon to Management Prescription Category 1.5.
Response: None of the Alternatives applies a 1.5 Prescription to the Mount Logan North Roadless Area. Alternative 1 was developed to reflect one end of the spectrum of wilderness recommendations but even it does not recommend all roadless areas. Given the existing motorized road and trail intrusions in this area as well as the proximity of the already designated Mt. Naomi and Wellsville Mountain Wildernesses, this area was not included in the range of alternatives.

213. The Wasatch-Cache National Forest should change the proposed management prescription categories for the Mount Watson area to Management Prescription Category 1.5.
Response: Alternatives 1 and 2 apply Prescription 1.5 to this area displaying the effects of this option in the FEIS.

North Wasatch Ogden Valley Management Area

214. The Wasatch-Cache National Forest should implement proposed management prescription categories for the Upper South Fork Ogden River to Management Prescription Category 1.5.
Response: See Response 208.

215. The Wasatch-Cache National Forest should change the proposed management prescription categories for Upper South Fork Ogden River to Management Prescription Category 1.5.
Response: See Response 208.

216. The Wasatch-Cache National Forest should change the management prescription category in the Burch Creek area to Management Prescription Category 4.2 or 4.5.
Response: Alternative 5 applies Prescription 4.4 which allows new recreation development such as the suggested gondola.

217. The Wasatch-Cache National Forest should change the proposed management prescription categories for the Francis Inventoried Roadless Area to Management Prescription Category 2.6.
Response: Alternative 2 applies this prescription to the area and displays the effects of this option in the FEIS.

218. The Wasatch-Cache National Forest should change the management prescription category in the Wheeler Creek area.
218.1 To Management Prescription Category 2.6
Response: Alternative 7 applies Prescription 3.1W to this area. Prescription 3.1W does not allow road construction or recreation development regardless of whether the area is inventoried roadless.

218.2 To Management Prescription Categories 3.1/3.2
Response: The sliver of Prescription 4.5 along the old Snow Basin Road which was of concern to this respondent has been removed in Alternative 7 and the suggested Prescription 3.1 applied to this area.

219. The Wasatch-Cache National Forest should change the management prescription category in the Morgan/Davis county line area to Management Prescription Category 2.6.
Response: Alternative 2 applies the suggested prescription. Concern about motorized uses in the area, both summer and winter is better addressed with Recreation mapping rather than Prescription Categories.

Central Wasatch/Tri-Canyon Area

220. The Wasatch-Cache National Forest should implement proposed management prescription categories in the Tri-Canyon area by utilizing Management Prescription Category 4.5
Response: Thank you for expressing your views in support of this Prescription applied to this area in DEIS Alternative 6. All views were carefully considered during evaluation of the existing Alternatives and development of Alternative 7.

221. The Wasatch-Cache National Forest should change management prescription categories in the Tri-Canyon area.
221.1 To Management Prescription Category 1.5
Response: Alternatives 1 and 2 do this and display the effects of this option in the FEIS.

221.2 To Management Prescription Category 2.6
Response: Alternative 2 applies a 2.7 Prescription to this area with very similar effects to a 2.6 application although the specific direction to protect the Special Area (2.7) values would still need to be developed under this Alternative

221.2 To Management prescription Category 4.5
Response: As suggested, all Alternatives apply Prescription 4.5 to the existing ski area permit boundaries.

222. The Wasatch-Cache National Forest should reassess its designation for Little Cottonwood Creek.
Response: The Management Prescription applied to Little Cottonwood Creek is 3.1 in Alternatives 1-6 and 3.1A in Alternative 7 emphasizing aquatic habitat and watershed values. All management prescriptions in the Revised Forest Plan apply ONLY to National Forest System lands. Private and other ownerships are shown in gray on maps and are clearly outside the jurisdiction of the Forest Service and the Forest Plan.

223. The Wasatch-Cache National Forest should change management prescription categories for Mount Aire.3
223.1 To Management Prescription Category 1.5
Response: Alternative 1 applies the suggested Prescription 1.5 to this area and displays the effects of this option in the FEIS.

223.2 To Management Prescription Category 4.1
Response: Alternative 3 applies the suggested Prescription 4.1 to this area and displays the effects of this option in the FEIS.

224. The Wasatch-Cache National Forest should implement the proposed management prescription category for Cardiff Fork, Big Cottonwood Canyon by utilizing Management Prescription Category 4.1.
Response: Alternative 3 applies the suggested Prescription 4.1 to this area and displays the effects of this option in the FEIS, however concerns about motorized recreation are not completely addressed by Prescriptions. The Recreation Opportunity Maps (both summer and winter) and Travel Management Plans provide direction for recreation and access. The word “generally” has been removed from the description of Prescription 4.2 in reference to non-motorized designation.

225. The Wasatch-Cache National Forest should change management prescription categories for White Pine Canyon to Management Prescription Category 4.5.
Response: Alternative 5 applies the suggested prescription to this area. Other Alternatives applying Prescription 4.1 do not allow new recreation development but do allow new trail construction which might allow for limited expansion of the adjacent ski area. Alternative 7 applies prescription 2.6 which does not allow either new recreation development or new trail construction.

226. The Wasatch-Cache National Forest should change management prescription categories for Mill D North Trail to Management Prescription Category 2.6.
Response: To provide the watershed protection emphasis you stated, we have identified this area as 3.1W for watershed emphasis. This better fits your concern than a 2.6 management prescription.

227. The Wasatch-Cache National Forest should change the management prescription category in east Mill D North to 2.6 to accommodate continued mountain bike access.
Response: All Alternatives with the exception of Alternative 1 allow mountain bike access in this area.

Bear Management Area

228. The Wasatch-Cache National Forest should change management direction for the Swan Creek Inventoried Roadless Area.
Response: Alternatives 4 and 5 apply the suggested 5.2/6.2 Prescriptions to this area, which also allows for the suggested roading, timber harvest, and trail construction. All alternatives allow for road reconstruction/realignment to reduce resource impacts. Alternative 5 also applies the suggested Summer ROS SPM and Winter Motorized Classes for the area. Suggestions about future motorized routes in this area can be considered during Travel Management Plan updates. See the Revised Forest Plan Chapter 4.A.6 for a discussion of the relationship between Recreation Opportunity Class mapping and Travel Management Planning.

229. The Wasatch-Cache National Forest should implement the proposed management prescription categories in Garden City Canyon by utilizing Management Prescription Category 3.2.
Response: Thank you for expressing your views in support of this Prescription applied to this area in DEIS Alternative 6. All views were carefully considered during evaluation of the existing Alternatives and development of the Alternative 7.

230. The Wasatch-Cache National Forest should change the proposed management prescription categories for Garden City Canyon to Management Prescription Category 2.7.
Response: Without a specific set of reasons why this Canyon should be designated a Special Interest Area, the 7 Alternatives do not include this Prescription applied to this area. Alternative 1 does apply Prescription 2.6 which has maximum protection for the area short of wilderness designation.

231. The Wasatch-Cache National Forest should implement the proposed management prescription categories near Bear Lake Overlake to Management Prescription Category 2.5.
Response: See Response 229.

232. The Wasatch-Cache National Forest should implement the proposed management prescription categories south of Highway 89 by utilizing Management Prescription Category 5.1.
Response: See Response 229.

Stansbury Mountains

233. The Wasatch-Cache National Forest should change the management prescription category on lands north and south of the existing Deseret Peak Wilderness to Management prescription Category 1.5.
Response: Alternatives 1 and 2 apply the suggested Prescription to this area and display the effects of this option in the FEIS.

Uinta Mountains

234. The Wasatch-Cache National Forest should change the management prescription category in the Uinta Mountains
234.1 To Management Prescription Category 1.5.
Response: Alternative 1 applies the suggested Prescription to most of the area and Alternative 2 applies it to some of the area with both of these Alternatives displaying the effects of these options in the FEIS.

234.2 To Management Prescription Categories 2.6 or 4.1
Response: Alternatives 2,3,and to a lesser degree 6 and 7 apply these Prescriptions to parts (mainly upper adjacent to existing Wilderness) but not all of the suggested area down to the trailheads. Alternative 2 provides the best display of effects of this option in the FEIS.

235. The Wasatch-Cache National Forest should change the management prescription category in the Lakes backcountry to Management Prescription Category 1.5.
Response: Alternative 1 applies the suggested Prescription to all and Alternative 2 to most of the area and effects are displayed in the FEIS.

236. The Wasatch-Cache National Forest should change the management prescription category for Boundary Creek to Management Prescription Category 1.5.
Response: Alternative 1 applies the suggested Prescription to this area and displays the effects of this option in the FEIS.

237. The Wasatch-Cache National Forest should change the management prescription category in Middle Fork Blacks Fork to Management Prescription Category 1.5.
Response: See Response 236.

238. The Wasatch-Cache National Forest should change the management prescription category in Hayden Fork and Upper Main Fork to Management Prescription Category 1.5.
Response: See Response 236.

239. The Wasatch-Cache National Forest should change the management prescription category for Black's Fork and Henry's Fork to Management Prescription Category 1.5.
Response: The boundaries of the 1.5 Prescription for these two areas were drawn based on the inventoried roadless area boundary that excludes existing roads.

Recreation Opportunity Spectrum

Recreation Opportunity Spectrum General

240. The Wasatch-Cache National Forest should explain how roadless areas can include roaded natural, rural, and urban Recreation Opportunity Spectrum categories.
Response: See appendix B-6 for definitions of the physical setting and the criteria used to establish evidence of humans, size, and remoteness. In some instances the remoteness or size criteria will delineate ROS categories that overlap inventoried roadless areas because of a buffer from an adjacent motorized road. In these cases the user experience is being affected by the adjacent activities such as motorized use or communities.

241. The Wasatch-Cache National Forest should add more semi-primitive motorized areas. Page 3-31, Content Analysis.
Response: See FEIS, Chapter 2 / Elements Common to All Alternatives / Past Decisions Not Being Revisited in Plan Revision / Travel Management Planning, *"Although this forest plan revision addresses winter motorized use, the designated routes open for summer motorized use remain in place consistent with current Travel Plans for all alternatives."* Although, ROS categories identify areas on the maps it does not mean that the entire area is open to motorized use, it means that an area is being affected by motorized use. Motorized use should occur on designated motorized travel routes only.

See Table 12.2 Comparision of Miles of Motorized Travel ways by ROS Category, FEIS, Chapter 3 / Topic 4 Recreation and Scenery Management, Environmental Consequences, Dispersed Recreation – Summer.

242. The Wasatch-Cache National Forest should recognize that semi-primitive non-motorized designations can be impacted by motorized designations on adjacent lands from the noise.
Response: See Appendix B – 6 for remoteness and size criteria.
Because of the capability of the existing GIS layers available at the time of the planning process a standard distance criteria was used for remoteness buffers. The

buffer distance was not modified to conform to natural barriers topography and vegetative screening, or other relevant features of local topographic relief and vegetative cover using GIS for the existing condition mapping. In some alternatives, District personnel did make modifications to the buffer based on personal knowledge or hard copy mapped data. See appendix B-6 Recreation Opportunity Spectrum and Winter Recreation Existing Condition and Alternative Mapping Process. Since the beginning of the planning process more updated layers have been developed for vegetation, and topography. This information will be incorporated into the final selected management direction.

243. The Wasatch-Cache National Forest should develop four winter recreation classes: wilderness, non-motorized, motorized, and motorized heli-ski to allow development of more accurate travel plan maps.
Response: We agree see appendix B–6, Recreation Opportunity Spectrum and Winter Recreation Existing Condition and Alternative Mapping Process.

244. The Wasatch-Cache National Forest should change management prescriptions and Recreation Opportunity Spectrum determinations.
Response: See Appendix B6 ROS process and Appendix B-5 for MPC process.

244.1 So that managers can manage the current and future demand for motorized recreation.
Response: See FEIS, Chapter 2 / Elements Common to All Alternatives / Past Decisions Not Being Revisited in Plan Revision / Travel Management Planning, *"Although this forest plan revision addresses winter motorized use, the designated routes open for summer motorized use remain in place consistent with current Travel Plans for all alternatives."* Except for Alternatives 1 and 2 where the Roadless rule was applied and motorized routes were affected. Since travel management planning did not occur during the plan revision motorized ROS classifications where only applied to motorized travel ways. As District Travel Management Plans are updated in the upcoming planning period, ROS classification may need to be amended to reflect the decision made there.

244.2 By not using roadless area boundaries for determining Recreation Opportunity Spectrum categories.
Response: Roadless area boundaries were not used to delineate ROS classifications in any of the alternatives. In alternatives that applied the roadless rule or MPC 1.5 motorized travel ways were converted from SPM to SPNM. If adjacent polygons were SPNM, buffer lines created by the SPM were dropped creating a larger polygon of SPNM that could seem to appear to follow Roadless area boundaries.

245. The Wasatch-Cache National Forest should address the applicability of the Recreation Opportunity Spectrum to mountain biking because mountain biking has increased in popularity since the Recreation Opportunity Spectrum was created.

Response: The ROS system was developed in the 1980's. Nationally the system is in the process of being updated to recognize new technologies and their effects on the recreation experience. Although, mountain biking trails are identified, (see table REC-7) ROS does not add or eliminate mountain biking use on travel ways the District travel management plan address mountain bike use on travel ways.

246. The Wasatch-Cache National Forest should clarify Recreation Opportunity Spectrum designations in Green Canyon.
Response: See response to comment 241 and appendix B-6 description of ROS process.

Recreation Opportunity Spectrum – Site-Specific Designations

247. The Wasatch-Cache National Forest should give some areas a summer Recreation Opportunity Spectrum designation of semi-primitive motorized.
247.1 All Roadless Areas
247.2 Certain areas in the Logan Ranger District.
Response: All alternatives have areas of SPM, see table REC-11.

248. The Wasatch-Cache National Forest should reallocate the area north of the High Uintas Wilderness to a winter use that is open to over-the-snow vehicles, seasonally, from December 1 to May 1.
Response: For motorized winter recreation the area north of the High Uinta Wilderness is considered as open in Alternative 5. See Winter Recreation maps Alternative 5.

249. The Wasatch-Cache National Forest should apply or extend semi-primitive motorized corridors to trails.
Response: See response to comment concern statement 241.
249.1 For Alternative 1 on the logan Ranger District, Richards Hollow, Seep Hollow and Cart Hollow Trails.
Response: We agree the change has been made to the ROS map of Alternative 1.

249.2 For Alternative 2 on the Logan Ranger District, Richards Hollow, Seep Hollow and Cart Hollow Trails
Response: We agree the change has been made to the ROS map of Alternative 2.

249.3 For Alternatives 1, 2, 3, 5, and 6 on the Logan Ranger District, Sink Hollow Trail
Response: We agree the change has been made to the ROS maps of Alternative 1, 2, 3, 5, and 6 on the Logan Ranger District.

249.4 For Alternative 1 on the Ogden Ranger District, Skyline Trail from North Ogden Pass
Response: We agree the change has been made to the ROS map of Alternative 1.

249.5 For Alternative 2 on the Ogden Ranger District, Skyline Trail from North Ogden Pass
Response: We agree the change has been made to the ROS map of Alternative 2.

249.6 For Alternative 6 on the Ogden Ranger District, Skyline Trail from North Ogden Pass,
Response: We agree the change has been made to the ROS map of Alternative 6.

Affected Environment

Environmental Values General

Management General

250. The Wasatch-Cache National Forest should effectively manage forest lands.
250.1 By providing balanced management
250.2 By managing for the long term
Response: This plan is focused on managing for the long-term by moving forested ecosystems toward properly functioning conditions and maintaining them into the future. We feel that a balance between various uses and outcomes has been an important factor in the development of this Forest Plan.

251. The Wasatch-Cache National Forest should preserve natural resources.
252.1 Before excessive impacts take place
251.2 While also balancing recreational demands
251.3 By writing a mission statement which emphasizes protection of resources
Response: We have focused on allowing activities on the Forest, while not adversely impacting the natural resources that occur. We have enhanced the public education direction in our Forest Plan.

252. The Wasatch-Cache National Forest should recognize that environmental damage is irreversible.
Response: While some impacts on the forest are irreversible, especially where soil loss has occurred or where development of roads and infrastructure are in place, other impacts can be mitigated or reversed. The Forest Plan, with its focus on properly functioning conditions, and with recommendations for wilderness, Special Interest Areas, and Research Natural Area expansions, recognizes the value of the resources we manage.

253. The Wasatch-Cache National Forest should recognize and respond as needed to natural ecological changes over given forest landscapes.
Response: Because of our past management actions, especially fire control, many of the ecosystems we manage vary moderately to greatly from historic conditions (see Table VEG-2, Topic 2 – Biodiversity and Viability, Vegetation). One of the

primary focuses of this plan is to move toward the historic range of variation, so that these ecosystems can function in a more natural state.

254. The Wasatch-Cache National Forest should provide protection to all representative natural communities.

Response: While most acres in wilderness areas of the Wasatch-Cache National Forest protect high elevation ecosystems, many of these areas range in elevation and protect a variety of plant communities and wildlife habitat. The Deseret Peak Wilderness Area ranges in elevation from near the bottom of Skull Valley up to Deseret Peak and includes various varieties of sagebrush as well as pinyon-juniper as well as Douglas-fir and limber pine and bristlecone pine. The Wellsville Wilderness Area ranges in elevation from near the valley floors in Cache Valley to the east and near Brigham City and Honeyville to the west. Juniper, maple, and sagebrush communities, as well as Douglas-fir and aspen communities are present. This plan proposes one new wilderness area near Causey Reservoir that includes a variety of elevations and no alpine areas. In addition, we are including an extension of the Morris Creek Research Natural Area east of Farmington, Utah that would include oak and mahogany communities at lower elevations, to Douglas-fir, aspen, and subalpine fir communities at the upper elevation. The Logan Canyon Special Interest Area, which is proposed because of its botanical resources (primarily rare plants, but also Douglas-fir, maple and juniper communities). Existing Research Natural Areas (Red Butte and Mollens Hollow) are primarily mid- to low-elevation ecosystems and provide additional protection.

255. The Wasatch-Cache National Forest should continue the current forest management system because forest health has improved under the current plan.

Response: While some characteristics of the Forest have quite clearly improved, some ecosystems are still far from functioning properly. Fire controls, historic livestock grazing, and some past timber harvest techniques pushed conditions far away from those that occurred historically. This plan focuses on moving more closely toward properly functioning conditions.

256. The Wasatch-Cache National Forest should recognize that roadless areas and watersheds are sufficiently protected under the proposed plan.

Response: We have added new analysis of each roadless area (Appendix C) and feel that under this proposed plan that we have focused on varying levels of protection and the different values of each roadless area.

Adequacy of Analysis

257. The Wasatch-Cache National Forest should clarify its criteria for range and watershed condition improvement.

Response: The criteria for range improvement (ground cover, desired conditions, and rate of improvement) are included in the 1998 Rangeland Health Amendment,

which is carried forward in this plan. Because of the various resource values and economic effects, Alternative 2, was not chosen as the preferred alternative.

Funding

258. The Wasatch-Cache National Forest should not use lack of funding as a justification for inadequate resource protection.
Response: While inadequate resource protection is undesirable, the Forest cannot control the amounts and kinds of funding we receive each year. We are required by law to work as funded.

Protection of Specific Areas

259. The Wasatch-Cache National Forest should protect the Tri-Canyon area to preserve solitude.
Response: Demands on the Tri-Canyon area are indeed intense and diverse. Comments on the Draft Preferred Alternative (6) caused us to reexamine the management direction developed for this area and to strengthen protection. Alternative 7 applies a 3.1w watershed emphasis management prescription to much of the non-wilderness, non-ski resort areas of the canyons. This prescription includes standards and guidelines that limit activities to protect watersheds which in turn provides for wildlife needs. The Revised Plan also has an Objective to emphasize education with a focus area on watershed protection so we can engage forest users in conserving this resource. The Revised Plan allows no new ski resorts and no ski resort boundary expansions during the planning period (10-15 years). The matter of solitude and human crowding is a difficult one given the proximity to the urban population of the Wasatch Front. Recreation opportunity classes have been mapped for the area and include semi-primitive non-motorized areas. These have user density numbers defined as thresholds. The monitoring strategy for these areas is to monitor user densities and when thresholds are approached, to initiate a public process for determining whether and how to limit user numbers.

260. The Wasatch-Cache National Forest should protect non-ski area lands in the Tri-Canyon area to balance ski resort development.
Response: See response 259.

261. The Wasatch-Cache National Forest should protect the Uinta Mountains.
Response: The FEIS displayed a range of alternatives and their expected consequences for the Uinta Mountains. Alternative 7 places management prescriptions to allow for some types of uses and development in certain areas while protecting other areas from any type of development. Some of the lower elevation lands in the Uinta Mountains are managed for timber production and oil and gas leasing, much is managed for backcountry recreation uses and wildlife habitat protection.

262. The Wasatch-Cache National Forest should protect the Mount Watson wilderness for future generations.
Response: The range of alternatives considers varying degrees of protection for this area. Alternative 7 protects this area through application of management prescriptions 1.5 and 2.6 neither of which allow any development.

263. The Wasatch-Cache National Forest should develop a management plan for Millcreek Canyon.
Response: The Revised Forest Plan puts in place broad management direction including mapped management prescriptions, recreation opportunity maps, and a desired future condition description for the Central Wasatch Management Area which includes Mill Creek Canyon. However, given that the plan must address the entire Wasatch-cache National Forest, it does not provide for very detailed and specific items for Mill Creek. Such a plan would need to be developed locally and that plan could be guided by the direction of the Revised Forest Plan.

Effects of Activities/Disturbance

264. The Wasatch-Cache National Forest should prohibit activities that damage the environment until it can provide adequate monitoring and enforcement.
Response: The Revised Forest Plan includes mapping of management prescriptions and recreation opportunities. We have tried to draw boundaries that are manageable and that take into account limited resources to monitor. In some cases, as we implement we may find that boundaries need to be adjusted to improve manageability and we can readily do that through amendment of the Plan. The Plan also sets Objectives specifically for education and enforcement with focus areas in OHV, user ethics, and watershed protection, and an Objective specifically to focus on improved management of grazing. These objectives and the desired future condition descriptions in the Plan emphasize gaining assistance from organized user groups to monitor, add enforcement presence, and improve our ability to educate forest users so they can assist in conserving the resources of the Forest.

265. The Wasatch-Cache National Forest should reduce use levels to minimize human impacts.
Response: Limits on numbers of people using the Forest is not directly decided by the Forest Plan. However, given the concerns expressed about this issue, we have identified some recreation opportunity classes (semi-primitive) that have user density thresholds. When monitoring shows we are approaching these thresholds, we will initiate a public process to decide whether and how to limit numbers of users in these areas.

266. The Wasatch-Cache National Forest should prevent littering.
Response: While the Forest cannot prevent littering. Environmental education is identified under numerous subgoals within the Forest Plan. Litter prevention is one component of this broad program.

Ecosystem/Restoration Management

Ecosystem/Restoration Management General

267. The Wasatch-Cache National Forest should preserve public lands in their natural state.

267.1 To prevent costly mitigation
267.2 For future generations
267.3 For their intrinsic value
267.4 For educational values

Response: An important focus of this Forest Plan is to move ecosystems toward properly functioning conditions, while providing various goods and services. As set in law, the mission of the Forest Service is to achieve quality land management under the sustainable multiple-use management concept, rather than through preservation, to meet the diverse needs of people. Timber harvest, where it is allowed, will follow best management practices to ensure watershed protection, nutrient cycling, and wildlife habitat diversity. Existing and proposed wilderness areas will focus on the natural functioning of the ecosystems within them. Existing and proposed Research Natural Areas and Special Interest Areas will be available for both educational uses and for research to help us understand the functioning of their ecosystems. These will benefit existing as well as future generations.

268. The final Forest Plan should redefine properly functioning ecosystems to reflect their dynamic nature and they should reconsider need for vegetation treatments.

Response: We use the Intermountain Region definition of properly functioning as it relates to historical range of variation in composition, structure (age class), and patterns on the landscape. These systems are dynamic and do not exist in a static state. Because of historic management and fire protection, most of the forested and non-forested types are skewed more toward the older age classes. And because of these factors, an estimated loss of approximately 65 percent of the aspen forests to conifer forests has occurred (O'Brien and Pope 1997). It will require a variety of tools, such as prescribed fire, wildland fire use, as well as some timber harvest, to help these ecosystems move toward the historic range of variation.

269. The Wasatch-Cache National Forest should not rely on intensive management to preserve forest resources.

Response: While the proposed plan does allow the use of timber harvest as one tool to help move the forested ecosystems of the Wasatch-Cache National Forest, other tools such as prescribed fire and wildland fire use will do much more to help these ecosystems to move toward properly functioning conditions. As illustrated in FEIS Table VEG-3 (Topic 2 – Biodiversity and Viability, Vegetation) only 5 percent of the acres treated would be treated through the use of timber harvest. Nearly 73 percent would be treated through prescribed fire and approximately 22 percent would be mechanically treated (oak fuels treatment).

270. The Wasatch-Cache National Forest should minimize human interference to preserve undeveloped lands.

Response: We agree that one of the biggest existing challenges and one that will continue in the future is population growth and its effects on our resources and resource conditions. We recognize that humans are a component of these ecosystems, and we want to allow activities that sustain healthy resource conditions into the future. Therefore levels of use must be managed for this to occur. By establishing desired future conditions, goals, subgoals, and objectives we feel that we have laid the framework from which future management decisions can address these issues.

271. The Wasatch-Cache National Forest should develop a comprehensive plan for ecosystem health and species viability.

Response: Guideline 14 in the proposed plan lists, by cover type, the landscape structure and patterns of "healthy" or properly functioning conditions. Table VEG-4 in FEIS, Chapter 3, Topic 2 – Biodiversity and Viability, Vegetation identifies the acres of different vegetations that would be treated through various actions to help move these ecosystems toward these desired conditions. See R 269 for additional information.

272. The Wasatch-Cache National Forest should address how land will be protected to maintain ecological function.

Response: The Forest Plan focuses on moving toward properly functioning conditions, which include composition, structure, patterns and function of various ecosystems at a broad scale. The means to achieve and maintain ecological function are outlined through desired conditions, goals, subgoals, standards, and guidelines outlined in the Forest Plan.

273. The Wasatch-Cache National Forest should consider noise pollution, erosion, and safety when protecting ecosystems.

Response: We have not addressed noise pollution in this Forest Plan, but watershed protection is one of the factors we have addressed through a Watershed Health Goal, various subgoals, standards and guidelines. Human safety remains foremost in our concerns with users on the Forest.

274. The Wasatch-Cache National Forest should define the term "ecological legacies."

Response: The term "ecological legacies" has been added to the Forest Plan glossary.

Restoration

275. The Wasatch-Cache National Forest should protect and restore ecological integrity.

275.1 To offset the impacts of development on surrounding lands

275.2 To ensure clean water, clean air, and temperature management

275.3 For their intrinsic value
275.4 By restoring degraded and damaged areas
Response: The direction provided in this Forest Plan puts primary focus on Properly Functioning Conditions of ecosystems across the Forest. We have taken into consideration, actions that occur on adjacent lands (federal, state, private, etc.) and viewed the role that this Forest plays in the context of surrounding land uses. The plan includes Forestwide direction (desired future conditions, goals and subgoals, objectives, and standards and guidelines) on managing the biological (plant and animal), physical (soil and water) and social resources that occur on the Forest. Restoration is integrated throughout management direction for many resources.

276. The Wasatch-Cache National Forest should aggressively restore the historic range of variability.
Response: This Forest Plan is focused on movement toward properly functioning conditions, which are those within the historic range of variability.

277. The Wasatch-Cache National Forest should have timber harvest workers perform restoration work.
Response: Various tools, including timber harvest, prescribed fire, and wildland fire use are identified as treatment methods to move various plant communities toward properly functioning condition.

Effects of Activities/Disturbance

278. The Wasatch-Cache National Forest should allow activities only to the extent that they do not impair ecological integrity.
Response: The focus of this Forest Plan has been to move the variety of plant communities toward properly functioning conditions and to allow activities that help achieve, or that do not interfere with reaching, those desired conditions.

279. The Wasatch-Cache National Forest should recognize that fires, erosion, and landslides are normal.
Response: Historically, fires, erosion and landslides occurred naturally on the landscape. However, because of various factors such as fire prevention many vegetation cover types have moved from fire condition classes 1 and 2 to condition classes 2 and 3, respectively (FEIS, Chapter 3, Topic 10 – Fire Management). There has been an increase in fuels to carry fires beyond their historic frequency and intensity. And because of increased human access, unnatural fire starts are more common. Various uses such as historical overgrazing and various early management actions have resulted in accelerated erosion and landslides that are outside the historic range of variation.

Active Management

280. The Wasatch-Cache National Forest should allow active forest management.

280.1 To preserve forest health
280.2 To achieve an increase in water yield
280.3 To achieve multiple use objectives
280.4 To address the issue of carbon sequestration
280.5 To ensure firefighter safety
Response: Active management is proposed to help improve forest health by moving various ecosystems toward properly functioning conditions, including a broader array of age class diversity among the different forested types. A result of this will likely be an increase in water yield where conifer communities are replaced by aspen. This management will allow for a broader compliment of habitat for wildlife, forest health, as well as forest products. Forest wide subgoals, and guidelines for large or coarse woody materials to provide for habitat and nutrient cycling are included in the Plan. More age class diversity within the forested types will reduce fire intensity and help to reduce the need for firefighters.

Multiple Use Management

Multiple Use Management General

281. The Wasatch-Cache National Forest should adequately address the impacts of multiple use management.
Response 281: Impacts of multiple use management (specifically motorized uses in this comment) are addressed in this FEIS to the degree that they can be for the broad land areas and required decisions to be made in Forest Plan revision. The FEIS displays broad sets of effects for each resource from each type of use. For summer motorized travel, site-specific environmental analysis is needed to change current Travel Management Plans for each Ranger District. The Revised Plan identifies as a priority Objective (see Revised Plan Chapter 4.A.3.) the need to update these specifically for the Ogden, Salt Lake, and Logan Ranger Districts because of issues raised here. It also includes criteria to be used during Travel Management Planning. In addition, the issue of education and enforcement was heard by the Forest Service and the Revised Plan sets specific priority Objectives for increasing these. For winter, the Revised Plan sets direction through Winter Recreation Class Maps to separate motorized and non-motorized uses in key areas in order to reduce conflicts between users and protect areas of critical big game winter ranges.

282. The Wasatch-Cache National Forest should recognize that the proposed Forest Plan allows for balanced recreation and multiple use.
Response 282: Thank you for expressing your support of the Proposed Forest Plan as an attempt to balance many competing uses.

283. The Wasatch-Cache National Forest should recognize that the multiple use mandate has been met b**ecause there are enough areas that provide motorized use**.

Response 283: The range of alternatives in this FEIS provides for display of the differing effects of various options for winter motorized and non-motorized use areas. We believe the multiple use mandate has been met. Alternative 7 attempts to achieve some balance while providing for the growing demands for each type of use. Travel Management Plans provide the details of routes designated as open to motorized uses in summer. These are reflected as they currently exist in Recreation Opportunity Class Maps for the Revised Forest Plan. Based on many concerns about the adequacy of Travel Plans for some Ranger Districts, the Revised Plan includes a priority Objective to update these Plans as well as an Objective to increase education and enforcement.

284. The Wasatch-Cache National Forest should recognize the cumulative impact of lost multiple use and recreation opportunities.

Response 284: The FEIS addresses closure of roads in Chapter 3, Topic 3, under the heading "Road Maintenance and Decommissioning". The effect of this on recreation and access is addressed in the FEIS in Chapter 3, Topic 4, under the heading "Effects on Recreation from Roads and Access Management."

285. The Wasatch-Cache National Forest should address the social, economic, and fairness issues related to exclusive use management.

Response 285: The FEIS addresses the wide range of views about how the Wasatch-Cache National Forest should be managed through development, analysis and display of a broad range of "reasonable" alternatives and their effects on social and economic conditions as well as environmental conditions. These Alternatives incorporate various degrees of different uses, different types of access, and various levels of active management of the land and commodity production, while maintaining the basic productivity of that land. The degree of polarization among those who commented on the Plan is reflective of the wide diversity of people who use and care about the Forest. "Exclusive use" is not intended and is specifically addressed in Revised Forest Plan Chapter 4A.5. under the heading "Multiple Use and its application in Management Prescriptions". The Revised Forest Plan has been designed to be consistent with the myriad of Laws that apply. Also, see Revised Forest Plan Chapter 1 for a discussion on how the Plan is guided by the 2002 Forest Service Strategic Plan (required under the Government Performance and Results Act).

Follow Traditional Multiple Use Management

286. The final Forest Plan should include the definition of multiple use used in the Black Hills Forest plan.

Response 286: The suggested definition of multiple use was clearly displayed both in the DEIS (Appendix D-1) and in the Proposed Plan (Chapter 4B). It is also displayed again in the FEIS (Appendix D-1) and in the Revised Forest Plan (Chapter 4.A.5).

287. The Wasatch-Cache National Forest should continue traditional multiple use management.
287.1 To comply with congressional mandates
287.2 Because there are already enough wilderness areas
287.3 To allow the constructive use of resources
287.4 Because Forest Service experts are not adequately informed
287.5 To follow the will of the public
287.6 To prevent environmentalists from pushing their exclusive agenda
287.7 Rather than restricting uses
Response 287: See Response 285.

288. The Wasatch-Cache National Forest should continue traditional multiple use management for environmental reasons to achieve forest health.
Response 288: See Response 285.

289. The Wasatch-Cache National Forest should continue traditional multiple use management for recreational purposes.
289.1 To preserve the diversity of recreational opportunities
289.2 To accommodate heli-skiing
289.3 To accommodate motorized recreation
289.4 To accommodate hunting
289.5 To resolve use conflicts
Response 289: Conflicts between different types of recreationists was identified early in the planning process as and issue that would need an array of different alternatives to address. Each of the 7 Alternatives included in the FEIS includes an explanation of how it addresses this issue. See FEIS Chapter 2 under the heading "Alternatives Considered in Detail" for this explanation. FEIS Chapter 3, Topic 3, Recreation provides a discussion of the effects of each alternative on various recreation uses.

290. The Wasatch-Cache National Forest should continue traditional multiple use management for social reasons.
290.1 To protect family unity
290.2 To preserve remaining open spaces
290.3 To accommodate experiences for stress relief
290.4 To provide funds for education
290.5 To protect heritage resources
290.6 To preserve western culture
Response 290: See Response 285.

Topic 1: Watershed Health Management

Soils, Water, and Geologic Resources

Soils Management General

291. The Wasatch-Cache National Forest should restore full riparian function and soil storage capacity to protect water quality and quantity.
Response: Thank you for your comment. The forest-wide desired condition for riparian areas as described under the Forestwide Desired Conditions in the revised Forest Plan states that riparian areas have a range of vegetative structural stages that are at or moving toward properly functioning condition (PFC). In this same section, the forest-wide desired condition is for soils have to have at least minimal protective ground cover, soil organic matter, and coarse woody material. It is expected that water quality and quantity are enhanced when riparian conditions are at PFC and soil productivity and quality are maintained or restored.

292. The Wasatch-Cache National Forest should revise soil disturbance guidelines to incorporate scale and environmental sensitivity.
Response: The scale is considered in the definition of an activity area which is described in the Glossary and Acronyms section of the DEIS.

293. The Wasatch-Cache National Forest should revise the standard SI to include a clause based on potential soil erosion by soil classification on slopes between 20 and 40 percent.
Response: The scale of soil mapping on the WCNF currently does not delineate slope groups between 20 and 40 percent. Because of this a forest-wide standard would not be appropriate. Clauses based on slope are best applied when more detailed site-specific soil information is obtained during project level analysis.

294. The Wasatch-Cache National Forest should reduce the standard for soil displacement in an activity area.
Response: The 15 percent standard is based on an estimate of the normal amount of natural variability and anything greater than 15 percent is assumed to be outside of this range and is most likely due to man's activity.

295. The Wasatch-Cache National Forest should recognize that maintaining existing soil productivity and water quality is unattainable under the proposed plan.
Response: As defined in the Glossary, the Multiple Use Sustained Yield Act of 1960 guides the management of the WCNF in that the surface resources of the national forests is to be utilized in a combination that will best meet the needs of the American people without impairment of the productivity of the land. This act and the regulations guiding the mission of the Forest Service recognizes that some site specific effects to the land and water resources may occur from multiple use

activities but the overall productivity of the land and quality of the water is not degraded.

Special Soil Communities

296. The Wasatch-Cache National Forest should adequately consider cryptogamic crusts.

Response: There is very limited information on the distribution of cryptogamic crusts and their role on the Wasatch-Cache National Forest. Additional analysis has been completed on the potential occurrence of, and impacts to, cryptogamic crusts and is included in **Chapter 3, Botanical Resources**. This new analysis and assessment identified areas of the Forest with the greatest potential for cryptogamic crusts and the effects from different uses in each alternative on those crusts. The Stansbury Mountains have the greatest potential for cryptogamic crusts because of the soil and vegetation characteristics. Because there is not a great difference in how the Stansbury Mountains are managed between alternatives with regard to livestock grazing and road and trail construction and subsequent unauthorized ORV use, there is little difference in potential impacts among alternatives to cryptogamic soil crusts.

297. The Wasatch-Cache National Forest should avoid disturbing tundra and talus soils.

Response: Most of the alpine communities on the Wasatch-Cache National Forest occur in designated wilderness. Talus slopes can occur at any elevation, but many of these also occur within designated wilderness. The greatest potential for additional impacts is in the upper portions of ski areas on the Forest. Site-specific assessments and analyses of any activities in these areas will be done to determine their potential impacts. We agree that the alpine ecosystems are fragile and that they warrant greater protection than most other ecosystems on the Forest. Talus communities at higher elevations provide important habitat for some wildlife species as well and impacts to associated rare plants and animals will be avoided.

Geologic Resources Management

298. The Forest Plan should adequately and consistently discuss geologic units.

298.1 By adding an appendix on geologic units

Response: We agree that geological information is important for mineral potential. However, for the decisions made at the Forest Plan scale, broad-scale geological information is used. It is the intent of the Forest Plan revision analysis to focus its attention on the major issues relating to Forest Planning. Detailed geological information is used in site-specific, project-level analysis when issues relating to geology are identified.

298.2 By providing a map showing where geologic units exist

Response: Although geology is not directly referenced in the DEIS, we relate occurrence of vegetation communities in terms of ecological subregions that uses

geology as a basic foundation. For a detailed description of the geology of ecological subregions, see McNab and Avers (1994) that is referenced in the section Broad Scale North-South Coniferous Corridor in the Affected Environment section of Topic 2- Biodiversity and Viability of the DEIS.

Aquatic Resources Management General

299. The Wasatch-Cache National Forest should protect riparian areas to preserve water quality.
Response: The proposed Forest Plan protects riparian areas through the use of standards such as those under Standards and Guidelines for Watershed Health and Biodiversity and Viability. Site-specific projects and mitigation such as placing troughs a distance from a spring would be analyzed through a project analysis and is not addressed at the planning level.

For example, in the Standards for Road/Trail and Access Management in Forest Management Direction section of the proposed Forest Plan, a standard states that 'summer motorized and mechanized access is managed on an "open on designated routes" basis'. This standard is carried through the more site-specific analysis for Ranger District Travel Plans where decisions regarding management of motor vehicle access and areas where motorized use is allowed are identified on specific areas. For example, the Salt Lake District travel plan states that all areas and routes are closed to motorized use unless designated as open. The travel plan allows motor vehicles on designated roads and trails, but not off of these routes, thereby protecting riparian areas. The Standards for Road/Trail and Access Management in Forest Management Direction section of the proposed Forest Plan, also provides protection for riparian areas through the use of Best Management Practices during construction and maintenance of roads, trails, and facilities.

Water Quality

300. The Forest Plan should state that the Forest Service will not impose more regulations regarding water quality than are already legally imposed by Salt Lake City.
Response: The WCNF recognizes the states of Utah and Wyoming has regulatory authority over water quality within the respective states. Although the WCNF is not considering imposing more stringent or inconsistent regulations regarding water quality, we don't feel that we need to explicitly state this.

301. The Wasatch-Cache National Forest should provide reference to more information on aquatic resources and water quality conditions and trends, including streams that are impaired and/or in need of improvement.
Response: In addition to listing state assessed impaired water bodies under the section Water Quality in Topic 1, Watershed Health of the DEIS, watersheds containing resource concerns are listed in the section Watershed Condition Assessment that include streams that need improvement.

302. The Wasatch-Cache National Forest should protect water quality from nitro aromatic compounds.

Response: On 04/10/2002, Charles Condrat, WCNF hydrologist talked to Ryan Rowland and Dave Naftz of the US Geological Survey regarding the nitroaromatic compound (NAC) study. They said the work done was a preliminary study that sampled NAC s in snow, soil, and lake sediments. He said that the snow and soil samples contained measureable amounts of NACs but not NACs were found in lake sediments. They said the study has a very small amount of data and that there is not enough information in which to set standards. Since there is very little data to support setting standards, standards for NACs in the Forest Plan would not be appropriate.

303. The final Forest Plan should include critical nitrogen load standards, based on research protocols developed for Colorado wilderness areas.

Response: The WCNF has a water quality monitoring program in cooperation with the State of Utah as described in the Water Quality section on Topic 1, Watershed Health of the FEIS. Nitrogen is one of the parameters analyzed in the water quality monitoring program and has not been found to exceed State standards in water bodies sampled on the WCNF. Setting critical load standards for nitrogen is not needed on the WCNF at this time.

304. The Wasatch-Cache National Forest should recognize the negative effects of sediment on the treatment of surface water.

Response: The WCNF has a cooperative water quality program with the State of Utah and samples are analyzed for sediment. Turbidity measurements have been effective for monitoring site-specific projects. For forest planning, water quality is assessed at a broad scale in order to plan actions to protect, maintain, or improve water quality.

305. The Wasatch-Cache National Forest should adequately address the issue of sewage spills into drinking water.

Response: In response to your comment, Florence Reynolds, water quality administrator for Salt Lake City (SLC), was contacted regarding sewage overflows that have occurred in the sewer systems in the canyons east of SLC. Florence said that since sewer systems have been operating, SLC has had two sewage overflows that were caused by ground surface activities near the sewer lines. Both were caused by dirt and gravel dumped into the sewer that caused a backup of sewage. The sewage overflows were caused by a construction project and by road maintenance. SLC water treatment plant was shut down immediately after being notified of the spills and operations resumed after the potential for contamination of the treatment plant had passed. The pipe itself is in good condition but it is other activities that have affected the sewer. Water quality has been very good before and after the sewer was installed in spite of the increase in the use and development of the canyons. The waste that has been taken out of the canyon through the sewer system contributes to the constant very high water quality in the canyons.

306. The final Forest Plan should assure non-degradation of state category 1 streams to comply with Utah State Code R317-2-3.2.
Response: The WCNF is required by State law to meet anti-degradation requirements. The Forest Plan has many standards and guidelines that provide means to meet anit-degradation requirements such as standards 1 through 5, 16, 17, 19, and guidelines1 through 10 in the FEIS.

307. The Wasatch-Cache National Forest should specify whether lakes listed with water quality problems are reservoirs.
Response: Pineview Reservoir is a reservoir, China Reservoir and Tony Grove Lake are natural lakes with a dam to raise their water level. Bridger Lake, Marsh Lake, Lyman Lake, and Mirror Lake are natural lakes.

Water Quantity

308. The Wasatch-Cache National Forest should enhance water production.
308.1 By studying rivers, streams, and watersheds for maximum ouput and benefits
308.2 By not recommending management prescription categories or wilderness designations that would detract from enhancing water production
Response: Enhancement of water yield form the WCNF is discussed under the section Effects on Soil and Water Resources from Timber Harvest/ Vegetation Treatments and in the cumulative effects section of Topic 1, Watershed Health. The effects analysis discusses limitations on enhancing water yield and the Forest Service has carefully considered water yield increases with other resource needs. Increasing water yield on the WCNF is one of many strategies to address water needs in Utah and Wyoming. The cumulative effects section describes that State water development plans include several strategies for meeting water needs in Utah and Wyoming.

309. The Wasatch-Cache National Forest should recognize the potential for increased water yield and resulting channel degradation from certain activities.
Response: See response 308.

310. The Wasatch-Cache National Forest should adequately address the issue of decreased water yield associated with declining aspen stands and growing conifer stands.
Response: In response to your comment a general statement regarding reduction in water yield is included in section Surface Water under Topic 1, Watershed Health. A detailed water yield analysis is not appropriate for the Forest Plan revision because forest planning is at a broad scale, which has many limitations as described in the section Effects on Soil and Water Resources from Timber Harvest/ Vegetation Treatments in Topic 1, Watershed Health.

Watershed Health Management General

311. The Forest Plan should recognize the Department of Interior's withdrawal of specific National Forest System lands for the purposes of the Provo River Project and the Provo River Channel Revision.
Response: The Forest Service recognizes that the Department of Interior withdrew lands for purposes of the Provo River Project and recognizes the right of the Provo River project to operate its lands and facilities. The Forest Plan Revision DEIS and Proposed Plan never intended to alter the operations of the PRWUA and that nothing in the proposed plan revision is expected to restrict the PRWUA from managing its operations within their authority.

312. The Wasatch-Cache National Forest should protect watersheds.
Response: Thank you for your comments. Watershed concerns are identified in Issue #5 and considered in alternatives in the FEIS and in desired future conditions, goals, and standards and guidelines in the revised Forest Plan.

312.1 From the pressures of population growth
Response: Population growth is a factor that is considered in the cumulative effects section of Topic 1, Watershed Health in the FEIS.

312.2 To preserve the water supply for a growing population
Response: Thank you for your comment. The canyons east of Salt Lake City are important public supply watersheds and are recognized as such in the section Water Quality and in the cumulative effects section under Topic 1, Watershed Health.

312.3 To protect groundwater supplies
Response: Thank you for your comment.

312.4 To hold water for continuous flow
Response: Thank you for your comment. The ability of land to hold water and provide water flow during drier periods of the year is described in section Wetlands, Riparian Areas, and Floodplains in Topic 1, Watershed Health.

312.5 By designating sensitive or damaged watersheds and directing future management accordingly
Response: The FEIS identifies watersheds and resource concerns in Table WA-2 and the revised Forest Plan identifies priority areas for management activities to address livestock grazing impacts under the section Forest Objectives.

312.6 By prohibiting any activities that degrade watershed health
Response: Thank you for your comments. The WCNF provides for multiple use and the FEIS recognizes that some activities have impacts on Watershed Health. The ten Watershed Health guidelines, with the exception of Guideline 9, are guidelines because they are not binding limitations placed on management activities, but are preferred or advisable actions. Deviation from these guidelines

will be documented in the appropriate analysis. In the FEIS, G9 is changed to a standard because, by definition, Soil and Water Conservation Practices are required during project implementation.

312.7 Rather than focusing on recreation management
Response: The WCNF provides for multiple use and recreation is a very important activity in the Tri-Canyon area. The alternatives provide a range of uses on the WCNF including those in the Tri-Canyon area.

313. The Wasatch-Cache National Forest should rehabilitate existing watershed problems rather than increase uses on roadless lands.
Response: Thank you for your comment. The reason for the subgoal "identify watersheds not in properly functioning condition" is that resource problems in individual watersheds are very site-specific and cause specific and more detailed information on the ground is needed to evaluate solutions to the resource problems.

314. The Final EIS should provide a map depicting current watershed status.
Response: Thank you for your comment. A map of watersheds has been added to the FEIS.

315. The Wasatch-Cache National Forest should consider adding the Mount Aire drainage to the Salt Lake City watershed.
Response: Thank you for your comment. The cumulative effects section describes activities at a broad scale on lands adjacent to the WCNF including Salt Lake City Watershed Plan.

316. The Final EIS watershed section should reference the Federal Multi-Agency Source Water Agreement.
Response: Thank you for your comment. This reference has been included in the FEIS.

Adequacy of Analysis

317. The Wasatch-Cache National Forest should establish benchmark landscape level watersheds as research control areas.
Response: Various uses on the Forest, including livestock grazing and OHV use among others, have had and continue to have impacts on vegetation and associated watershed conditions. An assessment of wildlife habitats is only done at a broad scale with this plan revision. While the forest has some information on forest structure and how it relates to goshawk habitat, we have not collected detailed monitoring data on vegetation undergrowth characteristics that could affect goshawk habitat. The understanding of unaffected conditions would be aided by the use of existing and proposed Research Natural Areas (RNAs) and Special Interest Areas (SIAs) as well as some areas within wilderness or proposed wilderness. We have proposed an expansion of the Morris Creek RNA and have proposed new SIAs for botanical purposes and for restoration ecology research. We

have also identified other areas as possible additions to the RNA/SIA system in FEIS, Chapter 3, Topic 8.

318. The Wasatch-Cache National Forest should provide detailed strategies regarding water management in the final Forest Plan.
Response: Water Planning is a statewide issue and the FEIS references the state of Utah and Wyoming in the cumulative effects section. State planning describes several management strategies for providing water. Additional information on water yield opportunities and limitations are discussed in the section Effects on Soil and Water Resources from Timber Harvest/ Vegetation Treatments.

319. The Wasatch-Cache National Forest should determine the current regime for watershed management before measuring the degradation of those regimes.
Response: Thank you for your comment. Additional information will need to be obtained for site-specific projects that may affect these resources.

320. The Wasatch-Cache National Forest should provide an adequate analysis of erosion processes in canyon streams.
Response: The section Geologic Hazards in Topic 1, Watershed Health of the FEIS, Utah is among eight states with a “severe” landslide hazard rating. The reference by Harty describes debris flows after intense thunderstorm events as exiting steep canyons such as those in Davis County and near Willard, Utah. In order to clarify the meaning, the term “flash flood” is changed to “debris flow” in the section Current Conditions under Revision Topic 1, Watershed Health in Chapter 2 of the Revised Forest Plan. Alluvial fans are formed by debris flows exiting steep canyons and depositing on a on a lower gradient slope in the valley. This is shown in Harty’s publication in a figure showing debris flow deposit forming an alluvial fan at the mouth of a steep canyon.

321. The Wasatch-Cache National Forest should provide a more detailed discussion of the effects of Alternative 2 on watershed condition to answer feasibility questions.
Response: The effects described in section Effects on Soil and Water Resources from Livestock Grazing under Topic 1, Watershed Health in the DEIS refer to effects on soil and water resources from livestock grazing. From comments on the DEIS, the effects were again reviewed and the conclusion made that effects from livestock grazing would be similar between most alternatives. These effects are described in the FEIS. Assumptions on budget are in FEIS Chapter 2, under Forest Plan revision outputs and services. The Forest Plan gives broad-scale planning for the WCNF and does not make site-specific decisions. A detailed description of effects on individual flora and fauna is not appropriate at this scale of planning because no site-specific actions are proposed or specific actions decisions are made.

Effects of Activities/Disturbance

322. The Wasatch-Cache National Forest should adequately analyze the effects of ski resort trash accumulation and avalanche control activities on watershed health.
Response: The Forest Plan revision addresses broad-scale planning for the entire WCNF. The issues you raise are best addressed during project-level planning and/or during review of ski area annual operating plan when site-specific actions can be identified to remedy the problem.

323. The Wasatch-Cache National Forest should recognize that road building and grazing cause more erosion than off-road vehicles.
Response: Road building, grazing and ATV use can cause erosion and the amount of erosion is dependent upon many factors including the amount of use, slope steepness, type of soil, soil conservation measures in place to reduce erosion. The FEIS describes these effects on a broad-scale. However, at the Forest Planning scale it is not appropriate to make general statements about one use resulting in less erosion than another because of the many factors involved. Differences between amount of erosion due to different activities is more appropriate at the site–specific project level scale of analysis.

324. The Wasatch-Cache National Forest should recognize that the magnitude of sediment transport attributable to reasonable use by motorized recreationists is relatively insignificant compared to the magnitude of natural sediment transport.
Response: Motorized recreation use can cause erosion and the amount of erosion is dependent upon many factors including the amount of use, slope steepness, type of soil, soil conservation measures in place to reduce erosion. The FEIS describes these effects on a broad-scale. However, at the Forest Planning scale it is not appropriate to make general statements about the amount of erosion from motorized recreation compared to natural since many factors are involved in the analysis that is appropriate at the site–specific project level scale of analysis.

325. The Wasatch-Cache National Forest should recognize the benefits of flooding on streams.
Response: Thank you for your comment. The benefits of floodplains are recognized in the section Wetland, Riparian Areas, and Floodplains in Topic 1, Watershed Health.

326. The Wasatch-Cache National Forest should prohibit snowmaking.
Response: The decision to permit snowmaking at Alta was made after a site-specific analysis of the Alta master development plan. This is the appropriate analysis for a decision on allowing snowmaking because it is site-specific.

327. The Wasatch-Cache National Forest should adequately study the effects of snowmaking activities on instream flows.
Response: The decision to approve withdrawals of water for snowmaking is based on a site-specific analysis using the expertise of hydrologists and fisheries biologists. In the record of decision for the Solitude Master Development Plan Update, an instream flow study is required as part of mitigation for effects of snowmaking withdrawals on Big Cottonwood Creek.

328. The Wasatch-Cache National Forest should restrict the importation of water from outside sources to enhance private development in the Tri-Canyon area.
Response: Thank you for your comment.

329. The Wasatch-Cache National Forest should amend the Forest Plan and EIS to reflect the fact that the impacts of diversions through the Duchesne Tunnel are not significant.
Response: We understand that there is disagreement regarding the significance of the impacts from the Provo River Project. We feel that the Provo River Project has had significant effects on the Duchesne River below the Duchesne Tunnel Diversion and on the Provo River below the outlet of the Duchesne Tunnel. Although the Upper Provo River Easement Maintenance Plan reaches the conclusion that no significant effects have occurred, based primarily on a hydrologic and hydraulic study, many other effects of increased flows are not discussed such as effects of movement of channel substrate on river organisms and the effects of stream bank erosion on downstream channel stability. These are a couple examples of many effects that have been identified in augmented water channel systems. However, the Forest Plan revision process addresses broad-scale planning for the entire WCNF and not site-specific projects such as the PRP. Since it was never the intent of the Forest Plan revision to make a decision affecting the current management of the PRP, it is not appropriate to conduct a detailed analysis of the PRP for the Forest Plan Revision.

330. The Wasatch-Cache National Forest should explain the environmental and economic impacts of any reduction in Duchesne tunnel diversions.
Response: The Forest Service recognizes that the Duchesne Tunnel diversions as an important source of municipal, industrial, domestic, and irrigation water for more than one million people. DEIS does not explain the environmental and economic impacts of any reduction in Duchesne Tunnel diversions because the final Plan does not restrict operations of the Provo River Project.

331. The Wasatch-Cache National Forest should clarify plans to implement alternative methods of water diversions.
Response: The Forest Plan revision addresses broad-scale planning for the entire WCNF. There are many factors that affect the decision on snowmaking, water withdrawals, dams, construction, transbasin diversions, and the authority of the Forest Service. Some of these factors are location of withdrawal point, amount of flow, amount of withdrawal needed, water right, ownership of land, and

environmental effects. These factors are very site specific and vary depending upon the location of the point of withdrawal and where or if it crosses Forest System Lands. The issues you raise are best addressed during project-level planning when site-specific alternatives and mitigation can be identified to come up with the best solution.

Access to Utility Infrastructure

332. The final Forest Plan should allow continued motorized access to alpine lakes that supply water to the Ogden area.
Response: See response 335.

333. The final Forest Plan should recognize the Provo River Water User's Association's right-of-way from the Mirror Lake Highway to the Duchesne Diversion.
Response: The Forest Service recognizes PRWUA's right to continued year-round motorized access along the gravel road that extends from the Mirror Lake Highway to the Duchesne Diversion. In addition, the Forest Service recognizes PRWUA need to have access to existing repeater sites.

334. The final Forest Plan should not restrict motorized access to any Provo River Water User's Association infrastructure.
Response: The Forest Service recognizes PRWUA's need for continued winter access to a variety of locations within the Wasatch-Cache Forest by helicopter, snowmobile and snow cat on very short notice for the purpose of monitoring snowpack conditions and forecasting snow melt runoff.

335. The final Forest Plan should explicitly mention the Central Utah Water Conservancy District's motorized access rights to its dam facilities in the Upper Provo drainage.
Response: The Forest Service recognizes the need for access to Federal facilities for which you have contractual obligations with the US Bureau of Reclamation. The Forest Plan does not intended to alter your operations and nothing in the plan is expected to restrict you from managing your existing operations.

336. The final Forest Plan should not restrict motorized access to any Bureau of Reclamation projects.
Response: See response 335.

337. The final Forest Plan should not restrict year-round motorized access to any hydroclimatic snow survey data stations.
Response: See response 335.

Other

338. The Forest Plan should acknowledge and present the reconstruction of the Trial, Lost, and Washington dams and the resulting stabilization of 12 connected lakes.
Response: This Information is summarized in the FEIS in the section under Western Management Area Descriptions under Topic 1, Watershed Health.

Air Resources

Air Resources Management General

339. The Wasatch-Cache National Forest should recognize that the desired condition regarding smoke emissions is not attainable.
Response: As described under the section Resource Protection Measures under Topic 1, Air Resources, the WCNF coordinates with the State of Utah Department of Air Quality to mitigate the effects on public health, public safety, and visibility. These efforts should be adequate to meet State air quality standards.

Adequacy of Analysis

340. The Wasatch-Cache National Forest should calculate off road vehicle emissions and obtain an air permit under the Clean Air Act.
Response: Additional information on effects of 2-stroke engines on air quality has been included on the FEIS in the section Effects on Air Quality from Snowmobiles under Topic 1, Air Resources. This analysis assumes that the air quality conditions due to snowmobiles in the Yellowstone study is worse than those on the WCNF because the overall amount of use and the uses in concentrated areas is less on the WCNF than at Yellowstone. It is expected that the conclusions in the section Effects on Air Quality from Snowmobiles also apply to ATVs and dirt bikes since air quality conditions in Utah are generally worse in the winter than in the summer.

Effects of Activities/Disturbance

341. The Wasatch-Cache National Forest should recognize that off road vehicles don't cause major air pollution problems.
Response: Additional information on effects of 2-stroke engines on air quality has been included on the FEIS in the section Effects on Air Quality from Snowmobiles under

342. The Wasatch-Cache National Forest should restore trees in valley areas to mitigate the effects of global warming.
Response: Thank you for your comments.

343. The Wasatch-Cache National Forest should recognize that humans cause only 5 percent of greenhouse gases.
Response: Thank you for your comments.

Topic 2: Biodiversity and Viability Management

Biodiversity and Viability Management General

Management General

344. The Final EIS should include a strong standard of viability to ensure the sustainability of all native species.
Response: NFMA requires the FS to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (NFMA Sec.6(g)(3)(B). This translates into 36CFR 219.19's requirement to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." These requirements make a specific standard unnecessary.

345. The Wasatch-Cache National Forest should revise the definition of viability.
Response: We have revised the definition in the glossary to match the intent of 36CFR 219.19 that states, "A population which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." It must be realized, however that there are some species such as the yellow-billed cuckoo that the state has identified as not breeding in the state that will be classified as not viable on the Forest because of this definition. These are species where the Forest is on the edge of their range and distribution across the Forest and/or breeding will not likely ever occur as is written in the definition.

346. The Wasatch-Cache National Forest should give priority to biodiversity and species viability.
Response: This commenter was pleased that the Forest was giving priority to biodiversity and species viability. Thank you for your comment.

347. The Wasatch-Cache National Forest should adequately discuss disturbance ecology and ecosystem resiliency.
Response: A section on districution ecology and ecosystem resiliency has been added to the Topic 2 – Biodiversity and Viability Section, Vegetation section.

348. The final Forest Plan should include actions to ensure viability of biological communities. The Forest should add specific goals, objectives, standards, guidelines and mitigation measures.
Response: We have goals, objective, standards, and guidelines to ensure the viability of biological communities. MIS are used to see if we are moving in the right direction with the management of those communities.

349. The final Forest Plan should improve the discussion of historic range of variation. Recognizing that climate change precludes reestablishment of many native ecosystems

Response: While we recognize that climate changes are occurring, to date we have not seen any of our native ecosystems fail to reestablish following disturbance, unless those disturbances have been extreme and outside historic levels.

Adequacy of Analysis

350. The Wasatch-Cache National Forest should conduct microsurveys of flora and fauna.

350.1 To identify geographical components of biodiversity.

Response: Table VEG-1 in the FEIS displays different cover types by ecological sections on the Forest.

350.2 To maintain healthy ecosystems.

Response: While microsurveys could improve our understanding of biodiversity and ecosystem functions, we have not had the ability to conduct them and feel that, at the forest plan level, direction is provided that will manage for healthy ecosystems and for biodiversity.

Effects of Activities/Disturbance

351. The Wasatch-Cache National Forest should assess continuing impacts of specific activities and compensate for them to effectively ensure population viability.

Response: The purpose of MIS is to assess impacts of activities on wildlife populations. If population trends of MIS decrease on the Forest all activities that might affect the decline will be assessed to determine the cause and appropriate action taken.

352. The Wasatch-Cache National Forest should establish controls on grazing and motorized recreation in research forest areas to ensure research results on silviculture are not distorted.

Response: The Forest recognizes that silviculture treatments recommended as a result of research conducted on one part of the Forest should not be applied to all ecosystems across the Forest. We also recognize that research has evolved and will continue to change in the future. We can only use the most recent and best information we have to make resource management decisions. We will continue to manage grazing and motorized recreation to limit their impacts to experimental forests.

Wildlife

Wildlife General

353. The Wasatch-Cache National Forest should address wildlife management.

353.1 By not allowing human uses of the forest to influence wildlife management direction

Response: By law the Forest Service is a multiple use agency and to that end decision makers within the Forest Service strive to find balance to the many uses on the Forest. This balance is different from forest to forest and even district to district on a given Forest. Knowing that every square foot cannot be managed for every use prescriptions have been assigned to different areas on the Forest where a particular use will be emphasized but not used exclusively for that prescription. With this approach we can better work with state wildlife agencies to help meet their management direction.

353.2 By taking an active role in managing wildlife, especially in managing non-native species.

Response: The Forest Service role in wildlife management including the management of non-native species is outlined in 36 CFR 219.19 and Forest Service Manual 2600.

353.3 By addressing conflicts between guidelines for management of specific species

Response: We have tried to eliminate any conflicts between guidelines for management of specific species and continue to look for any remaining conflicts.

353.4 By making recommendations regarding the appropriateness of wildlife transplants

Response: This is done through a Memorandum of Understanding with the Utah Division of Wildlife Resources according to direction in Forest Service Manual 2640.

353.5 By considering predator control and the reintroduction of bighorn sheep

Response: Predator control is conducted by APHIS-Wildlife Services. Their Environmental Assessment for Northern Utah allows work to protect wildlife after transplant or on important use areas, such as fawning areas, at the request of the Utah Division of Wildlife Resources.

354. The final Forest Plan should include actions to ensure species viability by adding specific goals, objectives, standards, guidelines and mitigation measures.

Response: See response 344 above.

355. The Wasatch-Cache National Forest should increase monitoring requirements for species population and habitat trends.

355.1 By adding protocols and numbers of sites
Response: Protocols and number of sites for management indicator species are discussed in Appendix J. Other species and species groups are monitored with accepted protocols with the number of sites that the budget allows. The Forest also uses inventory and monitoring information from other agencies such as the Utah Division of Wildlife Resources.

355.2 By increasing frequency and site requirements for threatened and endangered and management indicator species
Response: Monitoring threatened and endangered species is done in coordination with the Fish and Wildlife Service and the State. Management indicator species are monitored as identified in Chapter 5 of the Revised Forest Plan and in Appendix J of the FEIS.

356. The Wasatch-Cache National Forest should clarify its criteria for wildlife introductions.
Response: Wildlife introductions are covered in Forest Service Manual 2640.

357. The Wasatch-Cache National Forest should recognize that the presence of humans pushes out other species.
Response: We recognize this. This is why we have prescriptions assigned to different areas of the Forest that limits certain activities within the prescription area. See the Revised Forest Plan, Chapter 4 (B) Forestwide Allocations for the discussion and definition of prescription areas.

358. The Wasatch-Cache National Forest should protect humans over wildlife.
Response: Forest Service policy puts human safety above wildlife. The Standard is listed under Fire and Fuels Management in Chapter 4 of the Revised Forest Plan

Adequacy of Analysis

359. The Wasatch-Cache National Forest should add supporting data and habitat analysis to the viability section of the Final EIS.
Response: This has been done.

360. The Wasatch-Cache National Forest should conduct appropriate data collection for the species viability analysis and potentially use modeling.
Response: This is done opportunistically as budgets allow. The other approach to viability is ecological sustainability and this is discussed in Appendix 2-B. Regulations do not specify how viability is to be dwelt with, only that we must manage habitat to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.”

361. The Final EIS should include an analysis of anticipated changes in habitat components and discuss quantity, quality, and distribution.
Response: This has been done.

362. The Wasatch-Cache National Forest should consider the effect of possible mortality of wildlife in oil pits.
Response: The only pits used in oil and gas operations on the Forest are settlling ponds for water used in the drilling of new wells. After use they are buried and rehabilitated. There are no oil pits on the Forest.

363. The Wasatch-Cache National Forest should clarify the benefits of reduced tree density to wildlife.
Response: The section on "The Effects on Terrestrial Wildlife From Oil and Gas Activities has been rewritten and the statement is no longer in the document.

364. The Wasatch-Cache National Forest should revise the section regarding effects to terrestrial wildlife from roads management by adding an explanation that some species of wildlife are more sensitive to disturbance than others.
Response: The words, "…and the species of wildlife," have been added to the second sentence along with another sentence of further explaination.

Wildlife Habitat

365. The Wasatch-Cache National Forest should determine acres of high quality habitat by vegetation type.
Response: The question is, "high quality habitat" for what species? Goshawk and snowshoe hare both use the same vegetation type but different age classes. To identify "high quality habitat" one enters into single species management, which is not practical both from the number of species that have habitat on the forest and from the budget aspect. These are reasons why we chose a coarse filter ecological sustainability approach in dealing with species-at-risk.

366. The Wasatch-Cache National Forest should protect critical habitat.
366.1 By providing adequate direction for wildlife habitat management
Response: This has been done.

366.2 By giving priority to actions that enhance habitat
Response: This is done through management goals and objectives that guide management in the direction of properly functioning condition within the historic range of variability.

366.3 By preserving large tracts of land
Response: The Forest presently has 310,500 acres of wilderness which is 40% of all Forest Service administered wilderness in the state of Utah. Alternative 7 recommends another 61,400 which, if Congress chooses to act, would bring the total acreage on the Forest to 371,900 acres which would be 45% of wilderness on National Forest System lands in Utah. There are also roadless areas and Research Natural Areas that protect important habitats.

366.4 By tying the monitoring of aquatic resources to specific management implementation
Response: Aquatic resources are monitored on a Forest wide basis through a revolving schedule outside of Forest Plan implementation monitoring.

366.5 By maintaining aquatic habitat through the application of Management Prescription Category 3.1
Response: Management Prescription 3.1 has been applied wherever it was determined to be the most important prescription for an area. We thank you for your comment.

367. The Wasatch-Cache National Forest should establish habitats as Sanctuary Preserve areas to protect specific species.
Response: Refer to Appendix B for a discussion of species-at-risk and the measures taken to protect them and ecosystem sustainability.

368. The Forest Plan should include the information in the Utah Division of Wildlife Resources' databases regarding wildlife habitats and streams to protect and enhance wildlife habitat.
Response: The Forest has used information from the UDWR in the planning process and is continually coordinating with them on individual project proposals.

Wildlife Corridors

369. The Wasatch-Cache National Forest should preserve wildlife habitat corridors.
369.1 By restoring wildlife habitats within the context of eco-regional planning.
Response: The Forest is moving in this direction by working for properly functioning condition for all vegetation types within the historic range of variability.

369.2 By protecting habitat corridors between forest areas
Response: See 369.1 above.

369.3 By protecting national forest lands sufficiently to offset adverse effects caused by management practices on private lands
Response: The Forest does this where possible. In the Bear River Range, however, approximately 2/3 of the lands within the Congressional boundary are of other ownership which severely limits any offsetting adverse effects.

369.4 By prohibiting extractive uses, motorized vehicles, and grazing in wildlife corridors
Response: By law the Forest Service is a multiple use agency. The Forest Plan is designed to help decision makers find the proper balance of uses in the management of the National Forest. The Management Prescriptions discussed in Chapter 4 of the Revised Plan and their application to Management Prescription Maps show

where certain uses will be emphasized. Management Prescriptions, however, do not denote exclusive use since the law mandating multiple use still applies.

370. The Wasatch-Cache National Forest should adequately address the effects of habitat fragmentation on native wildlife populations.
Response: This has been done in Chapter 3 of the FEIS.

371. The Wasatch-Cache National Forest should address the effects of wildlife corridor protection on grazing allotments.
Response: With standards and guidelines for forage utilization, management direction that leads to properly functioning condition within the historic range of variability, and proper management of livestock through allotment management plans corridors (both local between winter and summer range, and the large regional corridor that has been identified) can be maintained with livestock grazing in place along with other aspects of multiple use.

372. The Wasatch-Cache National Forest should close big game migration routes during the winter months.
Response: Protection of big game migration routes and important winter ranges is covered in Travel Management Plans.

373. The Wasatch-Cache National Forest should not manage for wildlife corridors, because corridor preservation limits multiple use.
Response: See the response to 371 above.

Native and Non-Native Species

374. The Forest Service should make native biodiversity the primary goal and organizing paradigm of management.
Response: Native biodiversity is very important to the Forest and we work with other agencies within the scope of 36 CFR 219.19 and Forest Service Manuals to this end.

375. The Wasatch-Cache National Forest should adequately address the management of non-native wildlife.
375.1 By removing non-native species
Response: Forest Service policy on non-native species is set in 36 CFR 219.19 and Forest Service Manual 2640.

375.2 By prohibiting the introduction of non-native species
Response: Forest Service policy on non-native species is set in 36CFR 219.19 and Forest Service Manual 2640.

376. The Wasatch-Cache National Forest should recognize mountain goats as a non-native species.
Response: Whether native or non-native, mountain goats are present and have been since placed in the Twin Peaks area of Little Cottonwood Canyon in 1967. With them being present the Forest follows Forest Service Manual (2642) direction.

377. The Wasatch-Cache National Forest should clarify its actions regarding non-native goats.
Response: See response on # 376, above.

Game Species

378. The Wasatch-Cache National Forest should protect big game species on an equal basis with other species.
Response: The desired condition of the wildlife resource is found in Chapter 4 of the Revised Forest Plan and addresses all species of wildlife without regards to any special classifications such as "big game." Where certain components of a "groups" or a species habitat is not in properly functioning condition and/or outside of its historic range of variability they may be addressed in specific goals, objectives, standards, and guidelines.

379. The Wasatch-Cache National Forest should protect and enhance big game winter ranges by closing big game winter migratory routes to human uses.
Response: This has been done on different areas on the Forest and is accomplished through travel plans.

380. The Wasatch-Cache National Forest should recognize the impact of elk on deer populations.
Response: Wildlife numbers, composition, and distribution are the responsibility of the individual States, are as the number of hunting permits issued. The Forest participates in the public input opportunities offered by the States in making recommendations that will help prevent adverse effects on the habitat that is within the National Forest System.

Predators

381.The Wasatch-Cache National Forest should address predator management.
381.1 By implementing predator management practices to meet population objectives
381.2 By maintaining authority over predator control
Response: Wildlife population objectives are set by the States. By law (The Animal Damage and Control Act of 1931, as amended), predator management is under the authority of APHIS-Wildlife Services (WS). Funding for the program comes from the Federal Government, the State, and the permitttees. The Forest is involved with input into WS NEPA process and having annual operating plan meetings with WS.

382. The Wasatch-Cache National Forest should not reintroduce predators, because they are not compatible with humans.

Response: There have been no official proposals to reintroduce any predators on the Wasatch-Cache National Forest. The policy on reintroductions is contained in Forest Service Manual 2640.

383. The Wasatch-Cache National Forest should permit the passage of wolves to the Uinta Mountains.

Response: If wolves return to Utah they will be under the control of the U.S. Fish and Wildlife Service (FWS) and managed as a threatened species. All activities concerning the wolf would be done through the consultation process with the FWS as outlined in the Endangered Species Act, Section 7.

384. The Wasatch-Cache National Forest should prevent the treeing of cougars with motorized vehicles.

Response: The hunting and pursuing of cougars is set and controlled by State law.

385. The Wasatch-Cache National Forest should protect the lynx.

385.1 By protecting lynx habitat

Response: The Forest has identified "linkage habitat" and "core habitat" in consultation with the FWS and Utah Division of wildlife resources. Lynx Analysis Units have been identified in the core habitat as outlined in the "Canada Lynx Conservation Assessment and Strategy" and appropriate standards and guidelines are contained in the Revised Forest Plan.

385.2 By recognizing the wide variety of factors influencing the status of the lynx

Response: These factors have been considered and worked with in mapping of core habitat and linkage habitat. Standards and guidelines have been developed to work within these habitats as well as working with the U.S. Fish and Wildlife Service through the consultation process on all proposed projects.

385.3 By developing goals and objectives or standards and guidelines specifically designed to mitigate impacts on the lynx

Response: This has been done in the revised Forest Plan.

386. The Wasatch-Cache National Forest should recognize that the need for a lynx corridor has not been established.

Response: The concept of wildlife corridors is well established and the importance of the Bear River Range (specifically addressed in this comment) is well shown by referring to McNabb's "Ecological Subregions of the United States: Section Descriptions." This corridor applies not only to lynx but to all mammals that have large movement areas and neo tropical avian migrants that depend on forested conditions.

387. The Wasatch-Cache National Forest should reevaluate any management prescription, management designation, or alternative selection made based on the Canadian lynx.
Response: The lynx was listed as a threatened species by the FWS over its historical range, which included Utah, and until the FWS changes that we work with them in meeting the intent of the law.

388. The Wasatch-Cache National Forest should recognize that studies on lynx management are inconclusive.
Response: See response to # 387 above.

389. The Wasatch-Cache National Forest should recognize that the lynx can survive along with multiple use activities.
Response: This is recognized and that is why the Revised Plan emphasizes properly functioning condition, historic range of variation, and ecological sustainability. However, when a species is federally listed under the Endangered Species Act we are put into a single species management situation that dictates some management emphasis outside of the multiple use arenas. Standards and guidelines that are specifically for lynx or other single species in most cases act as mitigation measures that make it possible for other multiple use activities to continue. All proposed projects on the Forest require some level of consultation with the FWS when federally listed species have been identified by the FWS as being present or having habitat on the Forest.

390. The Wasatch-Cache National Forest should remove the phrase "to the extent possible" regarding lynx management from the Draft EIS.
Response: This has been done.

391. The Wasatch-Cache National Forest should not close access to land because of possible lynx habitat.
Response: This has not been proposed.

Other Wildlife Species

392. The Wasatch-Cache National Forest should monitor beaver and snowshoe hares.
Response: Both beaver and snowshoe hare have been identified as management indicator species.

393. The Wasatch-Cache National Forest should reintroduce beaver.
Response: Where this is not a Forest Plan decision, the Forest has and will continue to discuss the reintroduction of beaver, in appropriate locations, with the Utah Division of Wildlife Resources.

394. The Wasatch-Cache National Forest should protect bats.

Response: Two bats, the spotted and Townsend's big-eared are Regional Forester designated sensitive species and are considered in biological evaluations required on all proposed projects. Others bats are considered when proposed projects may affect their habitat.

Fish

395. The Wasatch-Cache National Forest should protect native cutthroat trout by restoring and expanding its habitat.

Response: We recognize the role the Forest has in providing habitat for sensitive species and appreciate your support. Goals, subgoals, standards, guidelines and the identification of management prescription 3.1a provide for the protection of cutthroat trout habitat on the forest. In regards to the seven populations that may become extirpated with in next 15 years (FEIS, Table AQ-2) additional information has been provided.

Some actions are outside the jurisdiction of the Forest Service. Fish stocking and setting harvest limits are under the direction of the Utah Division of Wildlife Resources or the Wyoming Game and Fish Department, for Utah and Wyoming respectively.

396. The Wasatch-Cache National Forest should address the impacts of non-native fish species on native cutthroat trout

Response: See response for comment 395. The Forest is active in participating in the cutthroat trout conservation agreements and strategies identified in Appendix B of the FEIS. Coordination with the states are an important part of any conservation work.

397. The Wasatch-Cache National Forest should include the monitoring of trout habitat along with monitoring of condition indices to understand the ability of a given stream to support larger trout populations.

Response: We agree that habitat conditions are important to monitor. Habitat parameters are collected during fish sampling efforts. Habitat surveys will also continue to be conducted although; they are not identified in Chapter 5 of the Forest Plan. Chapter 5 of the plan identifies that surveys will be conducted in at least one subbasin (4th level HUC) per year.

398 The Forest Plan should de-emphasize non-native fish species

Response: It's important to understand that Native species are all species of plants and animals naturally occurring, either presently or historically, in any ecosystem of the United States. This is defined in the glossary and is taken from Executive Order 11987, 42 FR 26949, 1977 WL 23618 as directed by the President of the United States, May 24, 1977.

It is Forest Service Policy (FSM 2640.3) to:

2640.3 - Policy. It is Forest Service policy to:

1. Provide habitat for stocked species and assist in stocking and introduction operations to restore locally extinct indigenous species, to recover threatened and endangered species, and to introduce new species in coordination with State and Federal agencies.

2. Provide a variety of fishing, hunting, trapping, viewing, studying, and photographing opportunities and experiences in cooperation with the State fish and wildlife agencies.

3. Emphasize the protection, enhancement, and maintenance of habitats for production of wildlife and fish. Introductions or stocking of species may be made to restore resources following environmental changes, to provide recreation opportunities where reproduction is insufficient to meet demand, or to introduce new species desired by the public.

4. Favor native or desirable non-native species over new exotic species in stocking and introductions.

399 The Wasatch-Cache National Forest should define "undesirable fish."

Response: Undesirable fish are those where a joint agreement, between the State fish and wildlife agency and the Forest Service, cannot be reached when proposal to introduce a species has been made. Undesirable fish may also include species found on the Forest where joint agreement has been reached, between the State fish and Wildlife agency and the Forest Service, and the determination made that the species is undesirable.

2640.41 - Regional Forester. The Regional Forester shall:

1. Reach joint agreement with the appropriate State fish and wildlife agencies on proposals for introductions of the following fish and wildlife on National Forest System lands:

a. Exotic and non indigenous fish and wildlife to a National Forest where they do not presently occur.

b. Federally listed endangered and threatened species.

2. Coordinate exotic and Federally listed species introduction proposals with the Fish and Wildlife Service.

3. Coordinate recommendations on hunting, fishing, or trapping regulations to State and Federal fish and wildlife agencies in States with more than one Supervisor's Office.

2642 - INTRODUCTION OF INDIGENOUS AND NONINDIGENOUS WILDLIFE AND FISH. Occasionally, areas and conditions are found that would best suit fish or wildlife that are not indigenous to a forest. Introductions of wild turkeys in certain western forests are an example. Once introduced, further introductions are considered stocking and an environmental analysis is not required unless the action is determined to be controversial.

400 The Wasatch-Cache National Forest should clarify Table AQ-1 to state that it refers to historic rather than current presence of fish species.
Response: Thank you for your comment. This table has been corrected.

Amphibians

401 The Wasatch-Cache National Forest should clarify its management plan for amphibians
Response: Invertebrate Species Considered section of the FEIS appendix B gives the direction for invertebrate species where little information is know. The Provo River, below Soapstone Creek, was identified as Management Prescription 3.1A to provide protection for known spotted frog populations on Forest. Beaver Creek is also designated as 3.1a to provide for aquatic species, which would include historic habitat for spotted frogs.

No known monitoring is occurring in the Red Butte Research Natural Area for boreal toads. It is believed that if the boreal toad persists in the drainage the population is secure given the direction of management in RNAs.

Management and reintroduction of species will be done in accordance with Forest Service Direction identified in response 399.

402 The Wasatch-Cache National Forest should place amphibians on the priority list by adequately monitoring amphibians.
Response: See response to 401 and 402. The forest is working with the State fish and wildlife agencies to better understand current distribution of amphibians on the forest and provide for their conservation.

403. The Wasatch-Cache National Forest should recognize that the spotted frog is a historically occurring species
Response: Thank you for your comment.

Birds and Raptors

404. The Wasatch-Cache National Forest should incorporate the U.S.Fish and Wildlife Service's raptor guidelines into all management activities.
Response: Although not specifically referred to in the Plan or FEIS the forest uses these guidelines whenever it is appropriate in project planning.

405. The Wasatch-Cache National Forest should protect critical habitat for sensitive raptor species.
Response: Habitat for Regional Forester designated sensitive species is addressed and mitigation proposed in Biological Evaluations for site-specific projects. When other raptor species are identified within a proposed project area their presence, habitat needs, and mitigation measures to protect them are covered in the NEPA document.

406. The Wasatch-Cache National Forest should adequately address goshawk management.
406.1 By following recommendations in Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah (HCS).
Response: In March 2000 the 1984 Forest Plan was amended to incorporate recommendations from the HCS. This has carried into the new plan and is covered by several standards and guidelines.

406.2 By addressing livestock impacts to its habitat and prey base
Response: Livestock impacts are addressed in individual allotment management plans and covered in the standards and guidelines.

Management Indicator Species

407. The Wasatch-Cache National Forest should not dismiss a species from consideration as a management indicator species because it is difficult to monitor.
Response: One of the criteria used in selecting MIS was, "The MI is relatively easy to monitor, i.e. highly visible and in adequate numbers." To fulfill the purpose of MIS there is no need to choose species that are difficult to monitor. The process and MIS should be those that meet the requirement and intent of the regulations. MIS are discussed in Appendix J.

408. The Wasatch-Cache National Forest should improve its management of management indicator species.
408.1 By prescribing goals, objectives, standards, guidelines, and mitigation measures for all management indicator species.
Response: The purpose of MIS is not to manage the species but to monitor it to help determine the effects of projects on a broader group of species. MIS are protected under regulations on diversity and viability.

408.2 By developing an adequate monitoring program for management indicator species.
Response: Monitoring of MIS is covered in Chapter 5 of the Forest Plan and Appendix J of the FEIS.

408.3 By adequately monitoring macro-invertebrates as management indicator species.
Response: The Forest is not using macro-invertebrates as MIS in the new plan. Cost of analyzing samples was one of the main factors that could preclude doing the monitoring. Using the coefficient of condition for cutthroat trout will provide needed information on the aquatic health of the system (See the discussion in Appendix J of the FEIS).

408.4 By monitoring management indicator species no more than once a year.
Response: Appropriate monitoring techniques and time intervals are identified in Chapter 5 of the Forest Plan and in Appendix J of the FEIS.

408.5 By identifying habitat that is capable of supporting management indicator species.
Response: This is done in Appendix J of the FEIS.

408.6 By adequately analyzing the relationships between management indicator species, habitat, and other species.
Response: The reasons for picking particular MIS and available habitats for them are found in Appendix J. CFR 219.19(6) indicates that analyzing the relationships between MIS and habitat changes is part of the monitoring report.

408.7 By identifying management indicator species for aquatic ecosystems and for botanical resources.
Response: The Forest is following Regional direction is the selection of MIS.

408.8 By selecting additional terrestrial animals as management indicator species.
Response: The Forest picked species and the number of species needed to monitor the terrestrial and aquatic resources identified.

409. The Forest Plan should provide a detailed discussion of targeted management indicator species.
Response: MIS are discussed in detail in Appendix J of the FEIS.

410. The Wasatch-Cache National Forest should include predators as management indicator species, such as the wolverine and the mountain lion.
Response: See discussion on selecting MIS in Appendix J of the FEIS.

411. The Wasatch-Cache National Forest should rely more heavily on birds as management indicator species.
Response: See Appendix J or the FEIS for the discussion of the selection of MIS.

412. The Wasatch-Cache National Forest should include neo-tropical migratory birds within the MIS/SAR category.
Response: Neo-tropical migratory birds do not fit the selection criteria for MIS because the do not remain in the area year round and changes in population trends may be caused by factors outside of the control of the Forest. The subjects of MIS and SAR are distinctly different and have been split into two separate areas in the final EIS. SAR are discussed in Appendix B and MIS in Appendix J. SAR do include neo-tropical migrants where appropriate.

413. The Wasatch-Cache National Forest should designate the sage grouse as a management indicator species instead of the vesper sparrow.
Response: Sage grouse were considered but are not evenly distributed across the sage steppe habitat type on the Forest to be an effective MIS. The vesper sparrow has also been dropped. See discussion in 412 above.

Threatened, Endangered, and Sensitive Species

Threatened, Endangered, and Sensitive Species General

414. The Wasatch-Cache National Forest should revise the definition of sensitive species
Response: The Regional Forester is responsible for identifying which species will be identified as sensitive as directed by Forest Service Manual 2670.

2672.11 - Identification of Sensitive Species. Regional Foresters shall identify sensitive species occurring within the Region. They shall examine the following sources as possible candidates for listing as sensitive species:

1. Fish and Wildlife Service or National Marine Fisheries Service candidates for Federal listing (categories 1 and 2) under Federal Register Notice of Review.

2. State lists of endangered, threatened, rare, endemic, unique, or vanishing species, especially those listed as threatened under State law.

3. Other sources as appropriate in order to focus conservation management strategies and to avert the need for Federal or State listing as a result of National Forest management activities.

The changing of the definition and/or the addition or removal of species to or from this list is outside the scope of this analysis and decision.

415. The Wasatch-Cache National Forest should provide a full range of standards and procedures for the selection of sensitive species.
Response: See response to comment 414.

416. The Wasatch-Cache National Forest should manage all threatened, endangered, and sensitive species in the context of the overall, functional ecosystem
Response: Thank you for your comment. The plan tries to address biodiversity. See issue 3 in the Plan.

417. The final Forest Plan should include actions to restore habitat for threatened and endangered species such as the Lynx.
Response: In the eleven counties in Utah that the U.S. Fish and Wildlife Service (FWS) has identified as lynx counties the Forest has consulted with the FWS on ongoing activities. In the Forest Plan Revision, standards and guidelines have been incorporated to deal with Federally listed species including the lynx. The Plan also emphasizes management that moves the forest toward properly functioning condition and the historic range of variability which is the habitats and age classes that the lynx existed in over time.

418. The Wasatch-Cache National Forest should improve monitoring of threatened, endangered, and sensitive species
418.1 By increasing the plan objectives for non-project related monitoring of threatened and endangered species
Response: See the monitoring section in the Forest Plan. These species will be monitored as projects that could potentially impact them are planned and implemented.

418.2 By including clear monitoring requirement for threatened, endangered, and sensitive raptors
Response: See the monitoring section in the Forest Plan. These species will be monitored as projects that could potentially impact them are planned and implemented. The Forest will continue to work with the U.S. Fish and Wildlife Service and the States in these efforts.

418.3 By monitoring threatened, endangered, and sensitive plants
Response: See the monitoring section in the Forest Plan. *In addition to broad-scale inventory and monitoring of TES plants*, these species will *also* be monitored as projects that could potentially impact them are planned and implemented.

419. The Wasatch-Cache National Forest should include specific and individual conservation and recovery plans for all threatened and endangered species including the western boreal toad.
Response: The development of conservation and recovery plans is outside the scope of this analysis and decision. A number of the species are currently covered

by conservation agreements and strategies (see Conservation approaches for species-at-risk to maintain existing populations in Appendix B of the FEIS).

See also response to comment 402.

420. The Wasatch-Cache National Forest should include specific and individual conservation and recovery plans for all threatened and endangered species
Response: Individual species were reviewed along with potential threats. Standard and guidelines were then reviewed and/or developed to reduce the threats to the species at risk. Site-specific analysis and the development of implementation actions will be required to further reduce the potential threats to T, E, and S species. These site-specific analyses are beyond the scope of this analysis and decision.

Adequacy of Analysis

421. The Wasatch-Cache National Forest should conduct surveys for sensitive species before allowing certain activities
Response: As part of the site-specific planning process, Threatened, Endangered and Forest Service Sensitive species are reviewed and an analysis conducted to determine potential impacts. This information is maintained in a Biological Assessment and Biological Evaluation.

422. The Wasatch-Cache National Forest should recognize that the reconstruction of the Red Butte Reservoir dam and its subsequent maintenance plans to provide a refuge for the June sucker are premature
Response: This desired future is recognizing Public Law 106-65 dated October 5, 1999. This law directs the Secretary of the Army to convey Red Butte Dam, Reservoir and other improvements to the Central Utah Water Conservancy District.

423. The Wasatch-Cache National Forest should add Botrychium linear to Table B-4-1
Response: This plant has been added to Table B-4-1 and additional information on this species is in Chapter 3, Topic 2, Biodiversity and Viability, Botanical Resources, FEIS Appendix F, and in the Forest Plan, Chapter 4C under the Central Wasatch Management Area.

424. The Forest Plan should include a discussion of threatened and endangered species in the Environmental Consequences section
Response: This has been done. Thank you for your comment.

425. The Wasatch-Cache National Forest should add a sentence to the Endangered Species Act description stating that each federal agency will ensure that their actions are not likely to jeopardize threatened and endangered species
Response: This is covered under manual direction:
Forest Service Manual 2670.11 - Endangered Species Act. Section 2 of the Endangered Species Act of 1973, as amended 1978, 1979, 1982 and 1988 (16

U.S.C. 1531 et seq.; hereinafter referred to as the act) declares that ". . . all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

Vegetation

Vegetation General

426. The Wasatch-Cache National Forest should clarify vegetation management.
Response: The forest will be managed for a range of conditions that occurred historically, and not for any static state. Should climates change dramatically, the conditions the forest would be managed for would evolve accordingly. We have not seen, however, these kinds of dramatic changes within a planning period (10-15 years).

427. The Wasatch-Cache National Forest should clarify its finding of greater vegetative diversity in the Wasatch Mountains.
Response: No greater inventories have been conducted in the Wasatch Mountains than on any other portion of the Forest. In fact, other portions of the Forest have been inventoried to a much greater extent because of the timber and livestock production that occurs there. The greater diversity has been recognized through general observations and recent vegetation mapping which shows that this area includes a large variety of vegetation types because of the geological differences, which result in different soil characteristics, as well as the annual precipitation.

428. The Wasatch-Cache National Forest should provide a mix of vegetative age classes to maintain biodiversity.
Response: Guideline G14 and the associated table describe the desired mix of age classes for dominant cover types of the Forest. Alternative 7 is focused on moving the vegetation cover types toward properly functioning condition. Table VEG-3 in FEIS Chapter 2, Topic 2 – Biodiversity and Viability, Vegetation shows that Alternative 7 treats (harvest, prescribed fire, and mechanical treatments) an average of nearly 9,000 acres per year to move toward properly functioning conditions. This will help maintain biodiversity.

429. The Wasatch-Cache National Forest should maintain more old growth forest to protect threatened and endangered species.
Response: The direction outlined in the Forest Plan under Guideline G14, illustrates a variety in age classes by cover type; these range from about 20 percent in forested communities, to 20-40 percent in oak and mahogany communities. Forest wide Standard S13 has been modified to reflect this change in the minimum amount of old growth. It states that at least 20 percent of each forested cover type within each ecological section of the Forest “shall be maintained with old forest landscape structure”.

430. The Wasatch-Cache National Forest should ensure adequate amounts of snags and downed wood.
Response: Guideline 16 and the associated table describe the amount of snags and coarse woody debris that is desired following timber harvest activities. Additional management direction for snags and coarse woody debris can be found in Forest Service Manual 5150 and FSM 2550.

431. The Wasatch-Cache National Forest should use the wetlands Standard as a starting point for the development of an alpine vegetation standard.
Response: A modification has been made to Guideline 9 that includes avoiding soil-disturbing activities in alpine areas as well as on steep, erosive, and unstable slopes, and in riparian, wetlands, floodplains, and wet meadows.

432. The Wasatch-Cache National Forest should act to reverse aspen decline.
Response: The decision alternative focuses on such a reverse by treating approximately 3,700 acres of aspen, conifer, and conifer with aspen each year. Many conifer treatments would be focused in areas that historically had aspen and that still have the ability to be dominated by aspen following treatment. At this rate, aspen would return to its properly functioning condition within 8 decades.

433. The Wasatch-Cache National Forest should classify the treatment in conifer and aspen stands for increased water output as a vegetative treatment.
Response: One benefit of replacing conifers with aspen, as a part of treatments to increase age class diversity in aspen communities (See response 432), is that water yield may also increase. The extent of this increase is not easily identified, but some research has shown this to occur.
Increased water yield is considered a secondary benefit for primary treatment needs such as vegetative treatments to restore properly functioning condition and timber harvest for commercial purposes. The FEIS section on Effects on Soil and Water Resources from Timber Harvest/ Vegetation Treatment under Topic 1, Watershed Health states that the realities of generating significant water yield are limited because of land ownership, land allocation, vegetation type, variable elevations and aspects, and multiple resource needs. This is why the Forest Plan FEIS does not propose increasing water yield as primary output.

434. The Wasatch-Cache National Forest should maintain sagebrush communities.
Response: As noted in the FEIS, (Chapter 3, Topic 10 – Fire Management), sagebrush communities are currently classified as being in either Fire Condition Class 2 (Moderate alterations to the historic disturbance are clearly evident, such as one or more missed fire return intervals) and Condition Class 3 (The disturbance regime has been significantly altered) with a fire return interval of 0-35 years. Given that fires played an important historical role in the ecology of these sagebrush communities on the Forest, we propose to treat approximately 3,000 acres a year of sagebrush and pinyon-juniper that occurs on lands historically dominated by sagebrush to begin to return these communities to properly functioning conditions. As a result some of these areas will produce forage for

livestock, but all acres will provide for a greater variety of wildlife habitat as well as maintaining or improving watershed conditions.

435. The Wasatch-Cache National Forest should protect the habitat for five unique species of wildflowers.
Response: Guideline G23 has been modified and provides for protection for populations of rare plant species across the forest.

436. The Wasatch-Cache National Forest should revegetate with seed from native plants.
Response: The Forest Plan provides Guideline G22, which directs the use of native seed in revegetation efforts.

437. The Wasatch-Cache National Forest should preserve nonvascular plant species.
Response: We noted the value of non-vascular plants in FEIS, Chapter 3, Topic 2 – Biodiversity and Viability, Botanical Resources. Additional information has been added on the distribution and value of cryptogamic crusts to this chapter. Difficulty of identification of many of these non-vascular plants makes the development of species-specific management more difficult.

Adequacy of Analysis

438. The Wasatch-Cache National Forest should investigate the causes of tree mortality and mortality in old growth trees.
Response: The dominant cause of tree mortality is an overall aging of exiting forest communities as a result of successful fire exclusion. Because of this, age classes are skewed toward the older age classes, which means many more acres of trees susceptible to disease. There is a lack of diversity in age classes across the landscape, a build up of associate fuels, and increased disease, which have increased the acres in fire condition class 3 as described in FEIS, Chapter 3, Topic 10 – Fire Management.

Noxious Weeds

439. The Wasatch-Cache National Forest should adequately address noxious weed management.
439.1 By fairly evaluating the spread of noxious weeds
439.2 By developing a guideline which prohibits certain activities in areas where noxious weeds occur
Response: We have added information on the location of noxious weeds in FEIS Appendix H. A guideline (G25) for the management of noxious weeds has been added and Forest Plan Appendix III has been updated.

440. The final Forest Plan should include a clear definition and list of noxious weeds to prevent removal of desirable species.
Response: A list of Utah and Wyoming Noxious Weeds found in the different ecological sections of the Wasatch-Cache National Forest has been added to FEIS, Appendix H. A definition of noxious weed has been added to the Forest Plan and FEIS Glossaries.

441. The Wasatch-Cache National Forest should disclose the locations that are currently affected by noxious weeds.
Response: See response to 439.

442. The Forest Plan should include all Standards and Guidelines applied by vegetative community.
Response: The standards and guidelines in Appendix B2 were incorrectly displayed and have been removed from that Appendix and have been replaced with those in the Forest Plan.

Effects of Activities/Disturbance

443. The Wasatch-Cache National Forest should fence off representative vegetation areas from human and livestock use to study the effects of use.
Response: Exclosures have been used in the past to study areas with relatively little disturbances. While some of these exclosures have been maintained and some new exclosures established within the past 10 years, others have fallen into disrepair. Those exclosures that have not fallen into disrepair will likely continue to be maintained. In addition, proposed and existing Research Natural Areas are available for such studies and additional exclosures may be established on a site-specific scale to study the effects of various uses and management actions on different vegetation types.

444. The Wasatch-Cache National Forest should not spray herbicides or synthetic chemicals.
Response: This plan does not address the treatment methods allowed for noxious weeds and these will be addressed through future analysis. While we feel that, while the use of herbicides should be limited, the ecological impacts of the spread of noxious weeds may outweigh the ability to control them with other methods alone.

445. The Wasatch-Cache National Forest should not apply snow-stabilizing chemicals such as ammonium over ski runs in alpine habitats because the chemicals may lead to noxious plant invasion.
Response: The use of snow stabilizing chemicals on ski runs in alpine habitats has not resulted in noxious weed invasions on the Forest and such invasions are not anticipated. We will continue to monitor these areas for such invasions.

446. The Wasatch-Cache National Forest should prohibit plant collection.
Response: Plant collection for sustainable cultural uses is described in a Forest-wide subgoal in the Forest Plan. Other direction for the collection of plants is also described in Guidelines 31 and 32 in the Forest Plan. These collections will ultimately benefit the management and knowledge of plant species on the Forest.

447. The Wasatch-Cache National Forest should adequately address plant collection in the Forest Plan.
Response: See Response to 446.

Topic 3: Road and Access Management

Infrastructure General

Adequacy of Analysis

448. The Wasatch-Cache National Forest should use 2001 as a benchmark for peak traffic congestion targets in the Tri-Canyon area Because 2000 was a weak ski season.
Response: Thank you for your comment. The wording has been adjusted to set parking at 2000 levels not refer to congestion levels.

Trailhead Access and Parking

449. The Wasatch-Cache National Forest should actively encourage mass transit as proposed in the Draft EIS.
Response: Thanks for your comment. See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access.
449.1 By limiting the number of cars
Response: See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access. We are setting parking space limits.

449.2 By providing shuttle bus services
Response: See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access. We are setting parking space limits.

450 The Wasatch-Cache National Forest should work actively with other agencies and parties to develop a comprehensive transportation system for the Tri-Canyon area and by developing a ride and ski pass.
Response: See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access.

451. The Wasatch-Cache National Forest should work with the Utah Department of Transportation and Snowbird to add a bus pull-out lane and bus stops at the White Pine Canyon trailhead.

Response: See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access. See response 496.

452. The Wasatch-Cache National Forest should adopt the proposed parking capacity limit to encourage mass transit.
Response: Thank you for your comment.

453. The Wasatch-Cache National Forest should change the parking lot guideline to a standard and reword it.
Response: Thanks for your comment. This has been changed.

454. The Wasatch-Cache National Forest should provide more parking.
Response: We believe we are at a maximum parking capacity for the Tri-canyon area. Other modes of transportation can still be explored.

454.1 By permitting additional resort parking
Response: See the desired future condition for the Central Wasatch Management Area Roads/Trails/Access.

454.2 By providing additional parking areas only at the mouths of canyons
Response: See "Outside Framework Level of Analysis" as identified in the FEIS. This is outside the scope of this analysis.

454.3 By adding more winter trailhead parking
Response: This can best be dealt with during travel management planning. Travel management planning is part of the objectives of the Forest Plan. See "Outside Framework Level of Analysis" as identified in the FEIS.

455. The Wasatch-Cache National Forest should state in the Forest Plan that it will not impose greater parking regulations than those already imposed in Snowbird's Master Development Plan Record of Decision.
Response: We believe that we need to maintain flexibility to take appropriate action to protect or improve water quality and watershed condition, as more information become available.

456. The Wasatch-Cache National Forest should develop separate parking areas for snowmobilers and skiers In Franklin Basin.
Response: See response 454.3 The citation listed for Franklin Basin (Draft Plan 4-73) is the desired future. It is the Forest's desired future that in the Franklin Basin that parking for both motorized and non-motorized winter dispersed recreation use is provided and that conflicts between these uses have been minimized through some separation of used, clearly marked areas, user cooperation and additional law enforcement. Again this is the desired future and does not currently exist.

Trailhead Facilities and Signs

457. The Wasatch-Cache National Forest should reconsider placement of High Uintas Wilderness trailheads.
Response: See response 454.3

458. The Wasatch-Cache National Forest should provide garbage cans at trailheads.
Response: This is outside the scope of the Revised Forest Plan, but will forward the information to the responsible managers for their consideration.

459. The Wasatch-Cache National Forest should provide rest room facilities at trailheads for year-round recreationists.
Response: See response to concern statement 458.

460. The Wasatch-Cache National Forest should focus accessibility efforts on developed recreation facilities, rather than providing more motorized opportunities.
Response: We are trying to make our developed recreational facilities more handicap accessible are these facilities are upgraded. This is also the direction for the Forest wide goal under recreation

461. The Wasatch-Cache National Forest should improve signage
461.1 By replacing existing trail markers with more visible ones
Response: The Forest is following the existing National direction in this area as identified in "Sign and Poster Guidelines for the Forest Service, Engineering Staff, Washington, DC 1998. Publication EM-7100-15". Trail and road signing; closing, leaving open or adjusting road objectives and parking are developed during travel management planning. Travel planning is one of the objectives to be dealt with during this next planning period. See also "Outside Framework Level of Analysis" as identified in the FEIS.

461.2 By adding more wilderness trail signs
Response: See response to 461.1.

461.3 By adding signs at lakes that list restrictions
Response: See response to 461.1.

461.4 By changing informational signs at trailheads so as not to imply that motorized users cause greater damage
Response: See response to 461.1.

461.5 By creating a standard signing convention for travel restrictions to reduce confusion.
Response: See response 461.1.

461.6 By making signs larger and using more colors

Response: See response 461.1.

462. The final Forest Plan should specify use of ACQ lumber in on-forest construction projects instead of copper-chromium-arsenate-treated lumber due to toxicity concerns.
Response: See response 461.1.

Trailhead – Site-Specific

463. The Wasatch-Cache National Forest should add more parking lots at specific trailheads in the Beaver and Sinks areas
Response: See response 461.1.

464. The Wasatch-Cache National Forest should develop a trailhead at Norway Flats.
Response: See response 461.1.

465. The Wasatch-Cache National Forest should add a sign for the Mineral Fork Trailhead
Response: See response 461.1.

Road System Management

Adequacy of Analysis

466. The Final EIS should include an expanded discussion of road impact mitigation.
Response: See response 461.1. Additional information is also provided in the roads analysis found in the FEIS Appendix B-5.

467. The final Forest Plan should specify how maintenance workers will apply the Watershed Conservation Practices.
Response: See response 461.1. Additional information is also provided in the roads analysis found in the FEIS Appendix B-5. The training of personnel is outside the scope of this analysis.

468. The Final EIS should include a comparison of the effects of single-track motorized trails and roads.
Response: Many of the effects from access and travel management, be it from roads or trails, are similar. Some of the analysis however did recognize the difference in affects as identified in the Aquatic Diversity and Viability section of Appendix B in the FEIS. Appendix II in the Forest Plan identifies mitigation efforts to reduce sediment runoff from roads and trails.

Legal Considerations

469. The Final EIS should evaluate direct and cumulative impacts of road closures on Revised Statute 2477 routes
Response: See the FEIS under RS2477 road assertions of counties in the Outside of Forest Service Authority section.

470. The Wasatch-Cache National Forest should recognize Revised Statute 2477 road rights-of-way claimed by local governments for all routes in existence prior to 1976.
Response: See response 469.

471. The Wasatch-Cache National Forest should recognize that, by definition, Revised Statute 2477 road rights-of-way invalidate roadless areas.
Response: See response 469.

Road Construction and Reconstruction General

472. The Wasatch-Cache National Forest should not expand the road and off-road vehicle trail network.
Response: See response to 461.1.

473. The Wasatch-Cache National Forest should build roads to the center of wilderness areas.
Response: See response to 461.1.

474. The final Forest Plan should allow temporary road construction and potentially design them for later recreational use.
Response: Temporary roads are permitted under the Forest Plan. See also response to 461.1.

475. The Wasatch-Cache National Forest should reconstruct road and trail segments that are causing environmental impacts rather than close them.
Response: See response 461.1.

476. The final Forest Plan should prohibit roads across amphibian travel routes and prohibit new construction.
Response: See response to 461.1.

477. The Wasatch-Cache National Forest should avoid constructing roads in tundra and talus ecosystems due to the environmental sensitivity of these areas.
Response: Guidelines 7 and 9 addresses this.

478. The Wasatch-Cache National Forest should delete the first two sentences in the second paragraph on page 4-89 of the proposed plan because motorized route construction requires separate National Environmental Policy Act analysis.

Response: This is the desired future for the North Wasatch, Ogden Valley Management Area. It is believed that the analysis of the roads in the Public Grove area is important to define the future uses in the area.

Road Construction and Reconstruction in Roadless Areas

479. The Wasatch-Cache National Forest should allow road realignment and reconstruction in roadless areas
Response: See Allowed Activities Explanation. "Where Road construction is not allowed by Management Prescription the responsible official may authorize road construction or reconstruction when: . . . d. Realignment is needed to prevent irreparable resource damage by a classified road."

480. The Wasatch-Cache National Forest should allow temporary road construction in roadless areas and design them for later recreational use.
Response: See the roadless area evaluation in Appendix C. of the FEIS and response 461.1.

481. The final Forest Plan should redefine road construction so that trail construction in inventoried roadless areas is clearly allowed
Response: This is now clearly identified in Chapter 2 of the FEIS.

482.1 The Wasatch-Cache National Forest should prohibit road construction in roadless areas.
Response: This is within the range of alternatives as identified in the FEIS.

482.2 Mount Naomi area
Response: This is within the range of alternatives as identified in the FEIS.
482.3 South of the North Slope Road
Response: This is within the range of alternatives as identified in the FEIS.

Road Construction and Reconstruction – Site-Specific

483. The Wasatch-Cache National Forest should build a loop trail starting at state road sheds in Logan Canyon.
Response: Trail and road signing; closing, leaving open or adjusting road objectives and parking are developed during travel management planning. Travel planning is one of the objectives to be dealt with during this next planning period. See also "Outside Framework Level of Analysis" as identified in the FEIS.

484. The Wasatch-Cache National Forest should build an interlink trail for off-road vehicles parallel to Highway 152 in Big Cottonwood Canyon.
Response: See response 483.

485. The Wasatch-Cache National Forest should prohibit road construction in Public Grove
Response: See response 483.

Road Maintenance

486. The Wasatch-Cache National Forest should act to address its road maintenance backlog
Response: See response 483.

487. The Wasatch-Cache National Forest should be more efficient with road maintenance funds and personnel.
Response: See response 483.

488. The Wasatch-Cache National Forest should raise road maintenance and construction standards to lessen environmental impacts.
Response: A number of the roads that are adjacent or that pass through the Forest are interstate, U.S. or State highways. Counties also own some of these roads. We can work cooperatively with the agencies that manage these roads and their right-of-ways but cannot control their activities. Such is the case with State Route 152 up Big Cottonwood Creek or US Highway 89 up Logan Canyon. Standards 2 and 19 provide direction to reduce or eliminate sediment from entering water bodies from Forest roads.

489. The Wasatch-Cache National Forest should rewrite S-17 to apply to all roads and trails, not just decommissioned ones to ensure proper drainage.
Response: Standards 2 and 19 address your concern.

490. The Wasatch-Cache National Forest should remove all culverts and replace them with bridges across permanent streams.
Response: It is unrealistic and we believe unnecessary to replace all culverts with bridges. We do identify that the broad Forest subgoal is to "Maintain and/or restore stream channel integrity, channel processes, and sediment regimes . . .". We are also trying to meet the Forestwide Goal for Toad/Trail and Access Management. These goals, as defined in Forestwide Direction, are desired conditions to be achieved in the future. They are normally expressed in broad, general terms and are timeless. They may not be achieved on every site due to site-specific factors or existing condition.

491. The Wasatch-Cache National Forest should increase bridge maintenance.
Response: See response 488.

492. The final Forest Plan should address minimizing the impacts of road maintenance near stream channels.
Response: See response 488.

493. The Wasatch-Cache National Forest should implement designated access points to streams.
Response: We appreciate your support in this area.

494. The Wasatch-Cache National Forest should not close roads currently being maintained by volunteers.
Response: We believe that we need to maintain flexibility to take appropriate action to protect water quality and watershed health to meet the goals and desired future conditions as stated in the Forest Plan. This may require that roads currently being maintained through agreement with special user groups would need to be closed. Such closures would be identified through site-specific analysis during travel management planning. See also "Outside Framework Level of Analysis" in the FEIS.

Road Maintenance – Site-Specific

495. The Wasatch-Cache National Forest should increase road maintenance in roadless areas on the Logan Ranger District.
Response: ATV vehicle registration fees are collected and distributed by the states. They are not generally transferred to the Forest to maintain Forest roads and trails for ATV use. Money used to maintain Forest roads and trails are allocated from the Federal and not state funds.

496. The Wasatch-Cache National Forest should grade Forest Road 041 or restrict it to off-road vehicles and motorcycles.
Response: To address this individual concern through the Forest Plan is outside the scope of this analysis and is best dealt with through site-specific analysis during travel management planning as identified in the Forest Plan objectives. See also "Outside Framework Level of Analysis" in the FEIS and the roads analysis in the planning documents.

497. The Wasatch-Cache National Forest should plow the Tony Grove Lake access road in the winter.
Response: See response 496.

498. The Wasatch-Cache National Forest should not oil the Sinks Road.
Response: See response 496.

Road Closure

499. The Wasatch-Cache National Forest should only use signs to close roads rather than gates or traps.
Response: Roads are closed for a variety of reasons. Some are closed and retained in maintenance level 1 standard because administrative access is still required. Others are closed are rehabilitated because the no longer deemed necessary. The local forests do not establish fines for closure violations. These are set at a National level.

500. The Wasatch-Cache National Forest should not place tank traps where winter motorized users may get stuck in them.
Response: See response 496.

501. The Wasatch-Cache National Forest should close roads in environmentally sensitive areas.
Response: See response 496.

502. The Wasatch-Cache National Forest should close roads strategically in order to link roadless areas to increase connectivity.
Response: See response 496.

Road Removal and Obliteration

503. The Wasatch-Cache National Forest should reduce the miles of roads on the forest.
Response: See response 496.

504. The Wasatch-Cache National Forest should follow through with closure and reclamation of roads after timber projects are complete because cumulative environmental effects are occurring.
Response: See response 496. The correction of newly created unauthorized roads is dealt with in Standard S3, which closes unclassified roads and trails.

505. The Wasatch-Cache National Forest should continue converting roads to single-track trails, but do not restrict bicycling to those routes only.
Response: See response to 496.

506. The Wasatch-Cache National Forest should consider an alternative that converts the backlog of unmaintained roads to motorized trails. To provide challenging recreation opportunities at lower costs.
Response: See response 496.

507. The Wasatch-Cache National Forest should prioritize restoration efforts for environmentally damaging roads and ways.
Response: See response 496.

508. The Final EIS should accurately address the environmental consequences of obliterating roadways.
Response: See response 496.

Road Removal and Obliteration – Site-Specific

509. The Wasatch-Cache National Forest should decommission and restore roads and ways in the Bear Management Area.
Response: See response 496.

Ways and Unclassified Roads

510. The Final EIS should clarify the origin of unclassified roads.
Response: We agree that the best way to handle road closures is through site-specific analysis. See response 496.

511. The Final EIS should disclose how many miles of ways will be obliterated by alternative.
Response: Currently there is no set number of roads identified in the Forest Plan to be obliterated. This will be dealt with through Objective for OHV and non-motorized travel management planning when implemented. See also response 496.

512. The final Forest Plan should include specific road density limits of no more than 1 mile per square mile to address ongoing habitat fragmentation.
Response: Road density was a factor identified in the roads analysis in the FEIS. See response 496.

513. The Wasatch-Cache National Forest should not allow unclassified roads to be added to the Wasatch-Cache National Forest system.
Response: Standard 3 has been added to avoid the adding of unclassified roads and trails.

514. The Wasatch-Cache National Forest should prioritize rehabilitation and closure of ways.
Response: See response 513.

515. The Wasatch-Cache National Forest should increase funding to continue to reclaim off-road vehicle-created roads.
Response: Thank you for your comment. Funding for road decommissioning has been a Nation emphasis the past few years.

516. The Wasatch-Cache National Forest should balance the obliteration of redundant ways with recreational opportunity values.
Response: See response 496.

517. The Final EIS should discuss the impacts and mitigation of the growing problem of braided trails.
Response: See response 496.

Scenic Byways

518. The Wasatch-Cache National Forest should not upgrade the scenic byway between Red Bank and Beaver to accommodate higher speeds.
Response: See response 488.

519. The Wasatch-Cache National Forest should design the proposed Bear Lake overlook rest area to minimize impacts to campers at the Sunrise Campground.
Response: To address this individual concern through the Forest Plan is outside the scope of this analysis and is best dealt with through site-specific. See also "Outside Framework Level of Analysis" in the FEIS.

Trail System Management

Trail System Management General

520. The final Forest Plan should specifically address non-motorized trail system management and work in coordination with local user groups.
Response: Public involvement continues to play an import part in planning efforts at the local and Forest levels. This is part of the National Environmental Policy Act. See Appendix A of the FEIS.

521. The Wasatch-Cache National Forest should develop a comprehensive trails plan with local governments and user groups on the Logan Ranger District.
Response: See response 496.

522. The final Forest Plan should retain emphasis on trail system planning in the Tri-Canyon area to balance use with watershed protection.
Response: See response 496.

523. The Wasatch-Cache National Forest should remove the "mostly derived from existing routes" language from Roads/Trails/Access Desired Condition descriptions in the proposed Forest Plan.
Response: We have improved the discussion about trails in the management prescription areas of the plan and FEIS. The management prescriptions in most cases allow for the construction of new trails. However in area of concern for wildlife (MPC 3.2) no net increase in trail density is desirable (G3.2D-3). See also response 496.

Trail Construction and Reconstruction General

524. The Wasatch-Cache National Forest should meet trail construction and reconstruction targets in the Forest Plan.
Response: The ability of a forest to implement a forest plan is dependent on budgetary constraints. The Forest was very optimistic in the 1986 plan. We have tried to be more realistic in this plan.

525. The Wasatch-Cache National Forest should provide sufficient summer motorized use zones to allow expanded trail systems.
Response: With the clarification of allowing or not allowing trail construction identified in the FEIS, trail construction is allow in Alternative 5 in all management

prescriptions with the exception of existing wilderness, research natural areas, and undeveloped areas. Alternative 1 provides the other perspective. We believe this provide a sufficient range of new trail development opportunities for the analysis.

526. The Wasatch-Cache National Forest should adopt the Recreation Opportunity Spectrum map in Alternative 7 submitted by the public.
Response: See response 525.

527. The Wasatch-Cache National Forest should expand the motorized trail network.
Response: See response 496.

527.1 By taking advantage of existing snowmobile parking lots and trail corridors
Response: See response 496.

527.2 By reopening some old logging roads as off-road vehicle trails
Response: See response 496.

528. The Wasatch-Cache National Forest should not expand the motorized trail network because there is already sufficient opportunity.
Response: See response 525.

529. The Wasatch-Cache National Forest should first maintain and streamline the existing motorized trail system before constructing new trails.
Response: See response 525.

530. The Wasatch-Cache National Forest should provide more motorized loop trail systems to reduce damage and user-created trails.
Response: See response 496.

531. The Wasatch-Cache National Forest should develop motorized loop trail systems at the completion of timber sales to compensate for loss of opportunity due to road closures.
Response: See responses 525 and 496.

532. The Wasatch-Cache National Forest should spend more money to build durable off-road vehicle trails.
Response: See response 496.

533. The Wasatch-Cache National Forest should build more single-track motorcycle and mountain bike trails.
Response: See response to concern statements 525 and 496.

534. The Wasatch-Cache National Forest should not designate single use trails to prevent increases in trail density
Response: See response 525.

Trail Construction and Reconstruction in Roadless Areas

535. The Wasatch-Cache National Forest should allow motorized trail construction in roadless areas should be consistent with the Roadless Area Conservation Rule.
Response: See response 525

536. The Wasatch-Cache National Forest should not build motorized trails in roadless areas because there are enough trails already.
Response: See response 525

Trail Construction and Reconstruction – Site Specific

537. The Wasatch-Cache National Forest should complete the Bonneville Shoreline Trail.
Response: The Bonneville Shoreline Trail is identified as one of the objectives in the Forest Plan.

538. The final Forest Plan should include some means of accommodation for routing of the Bonneville Shoreline Trail through roadless and wilderness areas.
Response: Law sets wilderness designations. It is outside the scope of this document to make such recommendation in regards to the Bonneville Shoreline Trail until an analysis to address this site-specific concern is completed.

539. The Wasatch-Cache National Forest should expand Objective 20 to assure that completion of the Bonneville Shoreline and Great Western trails will not adversely impact protected species.
Response: We will be following the response to the concern statement 425 in this area.

540. The Wasatch-Cache National Forest should reconstruct the Pfeifferhorn hiking route.
Response: See response 496.

541. The Wasatch-Cache National Forest should reconstruct the trail to the top of Mount Ogden for public safety.
Response: See response 496.

542. The Wasatch-Cache National Forest should extend the North American Trail.
Response: See response 496.

543. The Wasatch-Cache National Forest should complete the Great Western Trail. Adopt proposed Alternative 7 to facilitate future additions.
Response: The completion of the Great Western Trail is identified as one of the Forest Plan Objectives.

544. The Wasatch-Cache National Forest should adjust prescription boundaries to increase motorized acreage on the Logan Ranger District so that developing an off-road vehicle trail system is possible in the area.
Response: See response 525.

545. The Wasatch-Cache National Forest should not adjust prescription boundaries in order to develop a motorized trail system on the Logan Ranger District.
Response: See response 525.

546. The Wasatch-Cache National Forest should create a trail between the Iron Mine Trail and the Murdock Basin trail system. (43310)
Response: See response 496.

547. The Wasatch-Cache National Forest should establish a Pullen Creek Trail. (43310)
Response: See response 496.

548. The Wasatch-Cache National Forest should create parallel two-track trails in the Norway Flats area.
Response: See response 496.

549. The Wasatch-Cache National Forest should extend the trail system in the Monte Cristo area on the Ogden Ranger District.
Response: See response 496.

Trail Maintenance

550. The Wasatch-Cache National Forest should increase trail maintenance to prevent damage caused by rerouting.
Response: The Forest tries to balance the management of resources within budgetary constraints. Standard 3 directs the Forest to close unauthorized trails and roads.

551. The Wasatch-Cache National Forest should invest more resources in trail maintenance due to damage caused by increasing off-road vehicle and hiking use.
Response: See response 550.1

552. The Wasatch-Cache National Forest should clear trails early in the season to prevent damage caused by rerouting.
Response: Thanks for your comment.

553. The Wasatch-Cache National Forest should adopt trail maintenance methods to reduce stream sedimentation.
Response: Thank you for your comment.

554. The Wasatch-Cache National Forest should redesign problem trails rather than close them to user groups whenever possible.
554.1 Mountain bikes
554.2 Motorized
Response: Thank you for your suggestion. See response 496.

555. The Wasatch-Cache National Forest should improve the safety of trails used by horses.
Response: See response 496.

556. The Wasatch-Cache National Forest should increase winter grooming and snowplowing.
Response: See response 496.

557. The Wasatch-Cache National Forest should begin using conveyor belt rubber for water bar construction.
Response: Thank you for your suggestion.

Trail Closure for Wildlife

558. The Wasatch-Cache National Forest should use seasonal rather than permanent closures for wildlife wherever possible.
Response: Thank you for your suggestion. See response 496.

559. The Wasatch-Cache National Forest should only close trails to motorized use if negative wildlife impacts are specifically documented.
Response: We appreciate your opinion but will continue to provide for wildlife through seasonal closures as deemed necessary on a site-specific basis. See response 496.

Trail Removal and Obliteration

560. The Wasatch-Cache National Forest should not rip and brush double-track trails to convert them to single track.
Response: See response 496.

561. The Wasatch-Cache National Forest should prevent user-caused conversion of single-track trails to off-road vehicle trails through closures and enforcement.
Response: See response 496.

562. The Wasatch-Cache National Forest should relocate any routes that would otherwise be closed by timber, mining, or grazing activities.
Response: See response 496.

563. The Wasatch-Cache National Forest should restore the obliterated section of the trail seven miles from Oakley starting from the Weber Canyon Road.
Response: See response 496.

Travel Management – Planning

Adequacy of Analysis

564. The Wasatch-Cache National Forest should inventory and ground-truth all roads and trails during the travel management planning process.
Response: See response 496.

565. The Wasatch-Cache National Forest should add an estimate of the number of miles and locations of user-created trails to the Final EIS.
Response: See response 496.

566. The Wasatch-Cache National Forest should add a column to Draft EIS Table 2-2 for the number of miles of trails closed to mountain bikes by alternative listing specific trail closures.
Response: The column has been added as table REC-13 in the FEIS. We have tried to list individual trail closures in the description of alternative in the FEIS.

567. The Wasatch-Cache National Forest should add a column for motorized recreation to tables that define allowed activities by management prescription category.
Response: We believe that this is better identified during travel management planning. Many management prescription categories allow travel on existing roads through the MPC but do not allow new trail construction. A yes or no in the description for motorized use allowable activities would not fully address the complexity of travel management by management prescription category.

568. The Wasatch-Cache National Forest should improve the cumulative effects analysis in the Final EIS.
Response: See response 496.

568.1 By assessing the number of miles and acres of motorized closures
Response: See response 496.

568.2 By analyzing the cumulative effects of foundation funding of environmental groups on motorized access
Response: This is beyond the scope of this analysis.

569. The travel management plan should fully consider the issues found in publication FS-643, Roads Analysis and evaluate specific questions.
Response: The roads analysis, for maintenance level 3-5 roads, has been completed and the findings are in the FEIS. Factors deemed appropriate for the Wasatch-Cache were analyzed. See also response 569.1

570. The Wasatch-Cache National Forest should add more statistics about use levels and opportunities for different recreational types.
Response: We appreciate your opinion on how an analysis could be done on motorized use. We however disagree and have complete what we believe is an appropriate level of analysis in the FIES.

571. The Wasatch-Cache National Forest should conduct more research on comparative effects of different uses.
571.1 Relative impacts of recreational uses
Response: Thank you for your comment. As opportunities exist attempts will be made to do additional research in this area.

571.2 Relative non-recreational versus recreational impacts
Response: Thank you for express your opinion.

572. The Wasatch-Cache National Forest should conduct more research on user numbers by recreational type to have accurate numbers for allocation decisions.
Response: A use survey will be conducted on the Wasatch-Cache during fiscal year2003

573. The Wasatch-Cache National Forest should develop a travel management plan alternative that better meets motorized recreationists' needs.
Response: See response 496.

Legal Considerations

574. The Wasatch-Cache National Forest should ensure that the travel plan complies with the Multiple Use Sustained Yield Act by keeping roads and trails open to motorized recreation.
Response: We believe that the FEIS and the Forest Plan are consistent with the Multiple Use Sustained Yield Act as identified in the FEIS. See multiple-use as defined in the Forest Plan.

575. The Final EIS should discuss how Executive Orders 11644 and 11989 interfere with multiple use management for motorized recreation.
Response: We appreciate your opinion in this area. With these two orders being Executive Orders, both being in place for over 25 years, and with Code of Federal Regulations 36 CFR 295.2 Planning and Designation for Use of Vehicles Off forest Development Roads, we believe the discussion of existing condition provide an

adequate description of recreation use on the forest with respect to these two executive orders. See also response to concern state 496.

576. The Wasatch-Cache National Forest should not interpret Executive Orders 11644 and 11989 to require minimizing user conflicts. Non-motorized users who object to motorized uses should stay in non-motorized zones.
Response: We appreciate your opinion in this area. However, in the Code of Federal Regulations 36 CFR 295.2 Planning and Designation for Use of Vehicles Off forest Development Roads, it states: "Off-road vehicle management plans shall provide vehicle management direction aimed at resource protection, public safety of all users, minimizing conflicts among users, and provide for diverse use and benefits of the National Forests.". It goes on to state, "Areas and trails shall be located to minimize conflicts between off-road vehicles use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors."

We continue to follow national direction provided in the law, Executive Orders, the Coder of Federal Regulation and Forest Service Manuals. See also response 496.

577. The Wasatch-Cache National Forest should not convert sections of the Continental Divide Trail to non-motorized use. Because it violates the intent of the National Trails System Act.
Response: See response 496.

Travel Management Mapping

578. The Wasatch-Cache National Forest should correct Recreation Opportunity Spectrum mapping errors.
578.1 Skyline trail
Response: Thank you for your comment the change has been made to the ROS maps.

578.2 Lewis Peak spur
Response: Thank you for your comment the change has been made to the ROS maps.

578.3 Upper South Fork Roadless Area winter motorized use
Response: Thank you for your comment the changes has been made in Winter Recreation maps for alternatives 1-6.

579. The Wasatch-Cache National Forest should improve the quality of travel and visitor maps.
Response: This is outside the scope of this document but the comment will be retained and could be considered during the revising of the travel plans and visitor maps

579.1 By making the format consistent
Response: See response 579.

579.2 By making the format consistent with Bureau of Land Management maps
Response: See response 579.

580. The Wasatch-Cache National Forest should issue route maps with planning documents.
Response: You are correct. We are not revising the travel plan maps with this document.

581.1 The Wasatch-Cache National Forest should make travel management maps more readily available
Response: See response 579.2.

581.2 By adding vending machines
Response: See response 579.2.

Travel Management Allocation Decisions

582. The Wasatch-Cache National Forest should adjust management prescription allocations to match current winter motorized travel maps.
Response: The Winter Recreation maps used Management Prescription Categories to defined Wilderness and recommended Wilderness and other non-motorized categories, see all Winter Recreation alternative maps.

583. The Wasatch-Cache National Forest should adjust non-motorized boundaries so that adjacent motorized trails remain open.
Response: We have done this to the best of our knowledge.

584. The Wasatch-Cache National Forest should clarify whether management prescription categories are prescriptive or descriptive. By revising Recreation Opportunity Spectrum maps and plan to clearly state what is allowed where.
Response: The Management Prescription Categories are both prescriptive by identifying a list of allowed activities in a particular Management Prescription Category and descriptive by describing some of the tools that can be used to achieve an objective. See Revised Forest Plan, Chapter 4, Forestwide Allocations, Management Prescription Categories.

The purpose of the Recreation Opportunity Spectrum is to provide way to for managers to identify and create recreation settings from Primitive to Urban that allow recreationists to choose from a spectrum of recreation opportunities that meet the desire experience they are seeking. District Travel Plans, Winter Recreation Maps, Management Prescription Category Maps, and Oil and Gas Maps provide the framework to identify the location on the Forest for what is allowed.

585. The Wasatch-Cache National Forest should resolve contradictions between Recreation Opportunity Spectrum mapping and management prescription category descriptions. This is also true for motorized recreation management in Management Prescription Category 2.6.
Response: Thank you for your comment. An analysis was conducted to find where conflicts occur in all of the alternatives between the Recreation Opportunity Spectrum and Management Prescription Categories (MPC). Where Recreation Opportunity Spectrum categories could be adjusted to be compatible the MPC category they were. Otherwise if there is a conflict between the two allocations Management Prescription Categories takes precedence. See Revised Forest Plan, Chapter 4, B. Forestwide Allocations.

There is no conflict with existing motorized use in this Management Prescription Category (MPC) as identified in District Travel Plans and Forestwide Winter Recreation Travel plans. The Recreation Opportunity Spectrum (ROS) would have recognized the existing motorized use and it would have been mapped accordingly. See Alternative ROS and MPC maps.

586. The Wasatch-Cache National Forest should define how conflicts would be resolved when Recreation Opportunity Spectrum and management prescription categories conflict.
Response: Thank you for identifying this potential conflict. As you will notice in the introduction to Forstwide Allocations in the Forest Plan we have inserted, "However, in the instance of a conflict between direction for a Management Prescription and any of the three other layers, the Management Prescription takes precedence." The three other layers identified in the paragraph are Recreation Opportunity Spectrum (ROS), Winter Recreation (WR) and the Scenery Management System (SMS).

587. The final Forest Plan should state that the Winter Recreation Opportunity Spectrum category will take precedence over the management prescription category if there is a conflict.
Response: See response 586.

588. The Wasatch-Cache National Forest should remove prescriptions that can be misinterpreted when Recreation Opportunity Spectrum and management prescription categories conflict.
Response: See response 586.

589. The Wasatch-Cache National Forest should remove the summer Recreation Opportunity Spectrum maps from the final Forest Plan because they make site-specific motorized route determinations
Response: See FEIS, Chapter 3, Topic 4-Recreation/Scenery Management, General Effects, Summer Recreation.

590. The Wasatch-Cache National Forest should not establish different planning processes for summer and winter travel management. The Wasatch Cache National Forest should make changes to summer and winter Recreation Opportunity Spectrum maps where necessary.
Response: There was an attempt to use the ROS process for Winter Recreation, but it did not address the questions being ask by the public of *"When does Winter Recreation Management begin and end? Where can I snowmobile? Where can't I snowmobile? and Where is Heli-skiing allowed?" See FEIS, Appendix B-6, Recreation Opportunity Spectrum and Winter Recreation Mapping.*

See also response to concern state 496.

591. Travel planning should differentiate between off-road vehicle and motorcycle travel management.
Response: The FEIS does recognize the difference between motorcycle and ATV travel. See the Recreation section in the FEIS.

Travel Management – Motorized Access to Forest Resources

Motorized Access to Forest Resources General

592. The Wasatch-Cache National Forest should keep existing roads and trails open for the benefit of livestock producers.
Response: See response 455. We recommend that site-specific comments be brought up during travel management planning. See also response 496.

593. The Wasatch-Cache National Forest should allow winter motorized use to facilitate predator management.
Response: See response 496.

594. The Wasatch-Cache National Forest should keep existing roads and trails open to allow access for scientific study of paleontological resources.
Response: We recommend that site-specific comments be brought up during travel management planning. See also response 496.

595. The Wasatch-Cache National Forest should keep existing roads and trails open to allow access for ease of fuels reduction and firefighting.
Response: See the roads and fire analysis in the FEIS Chapter 3 and 10.

596. The Wasatch-Cache National Forest should keep existing roads and trails open to allow ease of access for hunting.
Response: The Forest is accessible. See roads analysis in the FEIS and the Forest Plan.

Adequacy of Analysis

597. The Final EIS should analyze the effects of motorized travel restrictions on fire and timber management.
Response: See response 496.

Motorized Access and Wildlife

598. The Wasatch-Cache National Forest should only restrict motorized use of roads in sensitive big game habitat.
Response: See the effects from roads section in chapter 3 of the FEIS. See also response 496.

Travel Management – Roads and Trails

Roads General

599. The Wasatch-Cache National Forest should designate dual-purpose roads in the travel management plan to allow off-road vehicles to legally use existing forest roads.
Response: See response 496.

600. The Wasatch-Cache National Forest should adopt the proposed "closed unless posted open" standard because it eliminates the motive to destroy signs.
Response: See standard 15. Thank you for your support in this area.

601. The Wasatch-Cache National Forest should adopt an "open unless posted closed" motorized use policy and include reason for closure on signs.
Response: We believe that having that designation route for where motorized use is allowed is consistent with 36 CFR 295. Direction is given to administratively designate and locate specific areas and trails of National Forest System lands on which the use of vehicles travel is allowed, restricted, or prohibited. Standard 16 reaffirms that summer motorized access is managed on an open on designated route basis.

602. The Wasatch-Cache National Forest should restrict all users to designated routes.
Response: See response to concern statements 601. and 496.

603. The Wasatch-Cache National Forest should restrict snowmobiles to designated roads.
Response: Restricting snowmobiles to designated routes only was not considered as an alternative because of increased management requirements and that resource damage held at a minimum once adequate snow depths are achieved.

604. The Wasatch-Cache National Forest should better sign areas closed to snowmobiles.
Response: This is outside the scope of the Revised Forest Plan, but will forward the information to the responsible managers for their consideration.

Trails General

605. The Wasatch-Cache National Forest should identify trail systems by riding units rather than individual trail segments.
Response: This is a travel management questions that is outside the scope of the Forest Plan analysis. Trails are broken down into small segments to track trail conditions and maintenance.

606. The final Forest Plan should keep all trails in roadless areas open to motorized use.
Response: In all alternatives existing motorized trails remained opened, except Alternatives 1 & 2 where portions of the Forest were recommended for Wilderness. See FEIS, Topic 5-Roadless areas – Effects on Wilderness characteristics and roadless area Values, and Wilderness Management for motorized trails that were affected by the alternatives.

607. The final Forest Plan should prohibit motorized travel on all trails due to user conflicts and trail damage.
Response: Thank you for expressing your feelings. This is beyond the scope of the Revised Forest Plan, but we will forward the information to the responsible managers for their consideration.

Specific Roads and Trails

608. The Wasatch-Cache National Forest should exclude Franklin Basin from a summer motorized trail network.
Response: See response 496.

609. The Wasatch-Cache National Forest should keep Providence and Millville Canyon Roads open.
Response: See response 496.

610. The Wasatch-Cache National Forest should not zone the East Fork Lodge trail area as non-motorized.
Response: See response 496.

611. The Wasatch-Cache National Forest should reopen the Turkey Trail to off-road vehicle use.
Response: See response 496.

612. The Wasatch-Cache National Forest should reopen the Leatham Hollow and Card Canyon East Trails to motorcycle use.
Response: See response 496.

613. The Wasatch-Cache National Forest should close the Willard Basin Road due to continuing erosion in the area.
Response: See response 496.

614. The Wasatch-Cache National Forest should open the North Slope Road to off-road vehicle use.
Response: See response 496.

615. The Wasatch-Cache National Forest should close and block the ford across the West Fork Blacks Fork to prevent motorized violations of wilderness area boundaries.
Response: See response 496.

616. The Wasatch-Cache National Forest should open Whitney Road (FR22) to off-road vehicle use.
Response: See response 496.

617. The Wasatch-Cache National Forest should not close Bear River Smiths Fork Trail 091 to motorized use.
Response: See response 496.

618. The Wasatch-Cache National Forest should close Bear River Smiths Fork Trail to motorized use.
Response: See response 496.

619. The Wasatch-Cache National Forest should open specific roads and trails near Smith and Morehouse Reservoir to off-road vehicle use.
619.1 Smith and Morehouse Reservoir to Gardner's fork road
619.2 Smith and Morehouse Reservoir to Little Elk Lake
Response: See response 496

620. The Wasatch-Cache National Forest should open Hoyt Park to the Swift Canyon off-road vehicle Trail to off-road vehicle use.
Response: See response 496

621. The Wasatch-Cache National Forest should open Mineral Fork Trail, in Big Cottonwood Canyon, to off-road vehicle use.
Response: See response 496

622. The Wasatch-Cache National Forest should keep Mineral Fork road open to motorized use.
Response: See response 496

623. The Wasatch-Cache National Forest should open Dog Lake Trail, in Big Cottonwood Canyon, to off-road vehicle use.
Response: See response 496

624. The Wasatch-Cache National Forest should open Cardiff Fork Trail to off-road vehicle use.
Response: See response 496

625. The Wasatch-Cache National Forest should close Tri-Canyon Trails to motorized use and enforce the closures.
Response: See response 496

626. The Wasatch-Cache National Forest should close Twin Creeks Road as proposed in Alternative 1 due to Sensitive soils and Non-motorized recreational values. **Response:** See response 496

627. The Wasatch-Cache National Forest should reopen the jeep road in South Fork Canyon.
Response: See response 496

628. The Wasatch-Cache National Forest should reopen Bunchgrass Road
Response: See response 496

629. The Wasatch-Cache National Forest should reopen roads to the Old Ephraim monument.
Response: The road up Temple Fork to the area is currently open in the travel plan.

Specific Areas

630. The Wasatch-Cache National Forest should not limit motorized access in the Blacksmith Fork area.
Response: See response 496. The selection of an alternative for the management of the Forest is one made by the Forest Supervisor. It is not a vote.

631. The Wasatch-Cache National Forest should allow motorcycle use in Ricks Canyon.
Response: See response 496

632 The Wasatch-Cache National Forest should develop an off-road vehicle system on the Logan Ranger District.
632.1 Because it is a requirement under the Recreation Opportunity Spectrum
Response: We are using ROS as a description of recreational experience. The use of this description does not require that all categories be used on any one area. See the description of ROS in the Forest Plan and response 496

632.2 To meet growing and projected demands
Response: See response 496. We recognize that we will not be able to meet the demands of all recreational groups on the Wasatch-Cache National Forest.

633. The Wasatch-Cache National Forest should allow off-road vehicle use in Logan Canyon.
Response: See response 496. ATV use in Logan Drainage is not closed with this FEIS. See the Desired Future Condition as identified in the Forest Plan.

634. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Temple Peak Roadless Area (Swan Creek Drainage) to allow construction of motorized trails.
Response: See response 496

635. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Swan Creek Roadless Area to allow construction of motorized trails.
Response: Alternative 5 ROS map shows this area as being managed as Semi-Primitive Motorized, but it does not allow the construction of new motorized trails. New motorized trail construction is outside of the scope of the Revised Forest Plan. Also see response to concern statement 496.

636. The Wasatch-Cache National Forest should change the summer Recreation Opportunity Spectrum for the Beaver Mountain area.
Response: See response 496

637. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Mount Logan South Roadless Area to allow construction of motorized trails.
Response: See response 496

638. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Mount Logan North Roadless Area to allow construction of motorized trails.
Response: See response 496

639. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Gibson Roadless Area to allow construction of motorized trails.
Response: See response 496

640. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Right Hand Fork Roadless Area to allow construction of motorized trails.
Response: See response 496

641. The Wasatch-Cache National Forest should reduce motorized acreage on the Logan Ranger District due to environmental and human health impacts
Response: See response 496

642. The Wasatch-Cache National Forest should designate Bunchgrass Hollow White Pine Canyon, Steam Mill Canyon, Hells Kitchen Canyon, Steep Hollow, Blind Hollow, and Logan Dry Canyon as non-motorized.
Response: These areas were considered closed to motorized travel in Alternatives 1 and 2. See Winter Recreation maps Alternatives 1 and 2.

643. The Wasatch-Cache National Forest should keep summer motorized closures in the Mahogany Ridge Roadless Area for wildlife.
Response: See response 496.

644. The Wasatch-Cache National Forest should change the Recreation Opportunity Spectrum for the Mahogany Range Roadless Area to allow construction of motorized trails.
Response: See response 496.

645. The Wasatch-Cache National Forest should designate Providence Canyon quarry open as a motorized challenge park area. Change management prescription category to read "Open on Designated routes and Areas"
Response: See response 496.

646. The Wasatch-Cache National Forest should restrict summer motorized use in Public Grove to existing designated routes.
Response: See response 496

647. The Wasatch-Cache National Forest should designate the Lewis Peak Roadless Area non-motorized or limit motorized users to alternate days by adding language to Forest Plan.
Response: See response 496.

648. The Wasatch-Cache National Forest should designate the Willard Roadless Area non-motorized.
Response: See response to 496.

649. The final Forest Plan should include new language to allow closure of Willard Basin to motorized travel if mitigation of off-road vehicle damage is not possible.
Response: See response 496.

650. The Wasatch-Cache National Forest should close Taylor Canyon to motorized use and development.
Response: See response 496.

651. The Wasatch-Cache National Forest should leave the area on the West Fork of Blacks Forks accessible by vehicles in all of the alternatives.
Response: The West Fork of Blacks Fork is accessible by vehicles in all alternatives.

652. The Wasatch-Cache National Forest should prohibit all recreational motorized use in the Tri-Canyon area for watershed protection.
Response: See response 496.

653. The Wasatch-Cache National Forest should prohibit all recreational motorized use in Mineral Fork in Big Cottonwood Canyon.
Response: See response 496.

654. The Wasatch-Cache National Forest should prevent motorized recreation by cabin owners in closed areas of Big Cottonwood Canyon.
Response:

655. The Wasatch-Cache National Forest should open White Pine Canyon to motorized vehicle access.
Response: See response 496

656. The Wasatch-Cache National Forest should zone Mineral Basin in American Fork Canyon as a summer non-motorized recreational zone.
Response: This are is on the Uinta National Forest and is outside the scope of the analysis.

657. The Wasatch-Cache National Forest should allow motorized use in American Fork Canyon.
Response: This are is on the Uinta National Forest and is outside the scope of the analysis.

Travel Management – Motorized Seasonal Restrictions

Motorized Seasonal Restrictions General

658. The Wasatch-Cache National Forest should institute seasonal closures for infrastructure along stream corridors.
Response: See response 496

659. The final Forest Plan should institute diurnal closures of existing roads across amphibian travel routes during the breeding season.
Response: We encourage the commenter to assist in identifying such routes during travel management planning. This would allow an interdisciplinary team to identify appropriate mitigation measures.

660. The Wasatch-Cache National Forest should eliminate seasonal closures during hunting seasons for hunter safety.
Response: We believe we need the flexibility to close roads to prevent resource damage. The use of firearms, no matter what the concentration of the public, is dangerous. Hunters should be aware of this and take appropriate action.

661. The Wasatch-Cache National Forest should further restrict mountain biking in Millcreek Canyon by limiting the number of days mountain bikes can use the Lower Pipeline Trail.
Response: See response 496

662. The Wasatch-Cache National Forest should not close trails to mountain biking in the Tri-Canyon area especially Mill D North Trails.
Response: See response 496

663. The Wasatch-Cache National Forest should restrict mountain biking in Big and Little Cottonwood Canyons.
Response: See response 496

664. The Wasatch-Cache National Forest should restrict mountain biking on the east slopes of the Mount Naomi Wilderness by recommending wilderness designation.
Response: This action is considered in Alternatives 1, 2, 3 and 6 in varying amounts depending upon the areas considered for Recommended Wilderness. See FEIS Chapter 3, Topic 4 Recreation/Scenery Managements, section Effects on Recreation from Inventoried Roadless Area Management.

Motorized Seasonal Restrictions – Site-Specific

665. The Wasatch-Cache National Forest should seasonally close FR 086 to any vehicle over 500 pounds.
Response: See response 496

Travel Management – Winter Motorized

Winter Motorized General

666. The Wasatch-Cache National Forest should not override Forest Plan management prescription category closures with special winter motorized travel maps.
Response: Management prescriptions are defined as "management practices, intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives". Management Prescription Categories provide a general sense of the management or treatment of the land intended to result in a particular condition being achieved or set of values being restored or maintained. Emphasis as used in these prescriptions is defined as focus or

highlighting, not exclusive or "dominant" use. In the event of a conflict between uses, resolution will be based on the specific merits of the situation rather than assuming that the Prescription implies a "trumping " of one resource over another. The entire Management Direction Package for the area must be considered, not just the prescription. This package includes a winter recreation map displaying areas open for or closed to motorized use. Most MPC's do not define whether or not winter recreation is allowed. Designated wilderness 1.1-1.4 is the only MPC that by definition does not allow motorized use.

667. The final Forest Plan should adopt clear and enforceable winter motorized closures throughout the forest.
Response: The Forest Service enforces existing laws and regulations through law enforcement and forest personnel. Travel management decisions, similar to all other decisions, made in the Forest Plan are based upon a variety of factors such as current use and public expectations, watershed and resource protection and ecosystem management. Mapping of decisions made in the Forest plan is the first step. This will be followed by signing, education and enforcement. The Forest Service will continue to work to educate user groups and individuals to prevent violations as well as through law enforcement activities.

Winter Motorized – Site-Specific

668. The Wasatch-Cache National Forest should close Smithfield Canyon to motorized vehicles in the winter.
Response: In the Wasatch-Cache Final EIS, Alternatives 1, 6, and 7 close Smithfield Canyon to Winter Motorized use.

669. The Wasatch-Cache National Forest should close Smithfield Canyon to winter snowmobile use due to damage occurring in low snow conditions.
Response: See response 668. The Wasatch- Cache Forest plan establishes a minimum snow depth of 12 inches. This snow depth is believed to be enough to protect the underlying resources and block most non-over the snow motorized use.

670. The Wasatch-Cache National Forest should designate Logan Dry Canyon as winter non-motorized for safety reasons.
Response: The Wasatch-Cache Forest Plan provides for Broad Scale Forest wide direction for management of Forest Lands. Specific travel management decisions such as this are based upon a variety of factors, including current public use and expectations, resource protection safety and compliance with applicable direction. Alternatives 1, 2, 6& 7 in the Final EIS close Dry Canyon to Motorized use.

671. The Wasatch-Cache National Forest should allow winter off-road vehicle use on the Hoyt Peak Trail.
Response: The Wasatch-Cache Forest Plan provides for Broad Scale Forest wide direction for management of Forest Lands. Specific travel management decisions such as this are based upon a variety of factors, including current public use and

expectations, resource protection and compliance with applicable direction. Every Alternative in the Final EIS except for Alternative 1 and 2 allows off road winter motorized use on the Hoyt Peak Trail.

672. The Wasatch-Cache National Forest should allow snowmobile use in the Willard area.
Response: The Wasatch-Cache Forest Plan provides for Broad Scale Forest wide direction for management of Forest Lands. Specific travel management decisions such as this are based upon a variety of factors, including current public use and expectations, resource protection and compliance with applicable direction. In the Final EIS, Alternatives 1 and 2 allow winter motorized use on the existing road in the Willard area. In addition, Alternative 3 allows winter-motorized use off road in the Willard Area.

673. The Wasatch-Cache National Forest should not close Tony Grove and adjacent areas to snowmobiles because closures are unmanageable due to surrounding open areas.
Response: Alternatives 3,4 and 5 in the Wasatch-Cache Final EIS allow increased motorized use in the Tony Grove area.

674. The Wasatch-Cache National Forest should close Tony Grove area to winter snowmobile use. This would also make the wilderness boundary enforceability.
Response: Alternatives 1&2 in the Final EIS close the Tony Grove area winter motorized use in this area. The Mt. Naomi Wilderness Boundary is well mapped and properly signed. It is every one's responsibility using this area to know where the wilderness boundary is and to obey the rules and laws governing that area's use.

675. The final Forest Plan should increase winter non-motorized zones to protect the yurt system on the Logan Ranger District from snowmobile intrusions.
Response: Alternatives 1 & 2 close this area for motorized use. Alternative 7 in the Wasach-Cache Final Environmental Impact Statement does not allow motorized use in a specific area between the Bunchgrass and Steep Hollow drainages within the Mt. Naomi roadless area. Please refer to the winter recreation maps in the Revised Forest Plan.

676. The Wasatch-Cache National Forest should close the area from Tony Grove turnoff to the Idaho border to winter motorized use.
Response: Winter motorized use along with non-motorized use will continue to be allowed. The Wasatch-Cache National Forest provides many types of recreational opportunities, one being snowmobile use. There will be areas of winter motorized use and areas of winter non-motorized use identified on winter recreation maps. Refer to response 675.

677. The Wasatch-Cache National Forest should close the area west of Franklin Basin Road to winter motorized use so that boundaries follow terrain features for ease of enforcement.
Response: Please refer to responses 675 & 676.

678. The Wasatch-Cache National Forest should create a ski-only trail in Franklin Basin.
Response: Please refer to responses 675 & 676.

679. The Wasatch-Cache National Forest should close Garden City Canyon and the adjacent area to winter motorized use.
Response: Please refer to responses 675 & 676.

680. The Wasatch-Cache National Forest should close the area west of Highway 89 in Sink Hollow to winter motorized use because Skiing and Snowmobiling are incompatible uses.
Response: Winter motorized use along with non-motorized use will continue to be allowed. The Wasatch-Cache National Forest provides many types of recreational opportunities, one of them being snowmobile use. Please refer to winter ROS maps in Revised Forest Plan that show areas which are open and which areas are closed to winter motorized use.

681. The Wasatch-Cache National Forest should not close the area in Sink Hollow to winter motorized use.
Response: Refer to response's 676 and 680.

682. The Wasatch-Cache National Forest should expand winter non-motorized zones in the Logan area.
Response: Alternatives 1 & 2 in the Wasatch-Cache Final EIS reduce the amount of motorized use on the Forest. Alternative 4 leaves the amount of motorize use the same. Alternative 6 does not allow motorized use in recommended Wilderness. Please refer to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in the Logan area.

682.1 Into areas with adequate snow coverage.
Response: There will be areas of winter motorized and winter non-motorized use mapped on the winter recreation maps as part of the Forest Plan and on District Travel Plans.

682.2 Into less hazardous terrain for avalanche safety reasons.
Response: There is a large amount of terrain in the Logan area mountains that has low slope angles and low avalanche hazard and is open only to winter non-motorized use. Alternative 7 in the Wasatch-Cache Final EIS makes the area from the Bunch Grass through the Steep Hollow drainages open to non-motorize use.

683. The Wasatch-Cache National Forest should keep Green Canyon closed to snowmobiles.
Response: The Revised Forest Plan keeps Green Canyon closed to Motorized use.

684. The Wasatch-Cache National Forest should allow snowmobiles in Green Canyon.
Response: The Revised Forest Plan keeps Green Canyon closed to Motorized use to allow for easily accessible non-motorized opportunity.

685. The Wasatch-Cache National Forest should close the Temple drainage to winter motorized use due to conflicts with skiers.
Response: The Forest Plan provides for broad scale management prescriptions and direction on how various areas will be managed. Areas of winter-motorized use along with areas of non-motorized use will continue to be allowed across the Forest. In Alternatives 1 & 2, winter motorized use is limited to existing roadways only with no off road use. Please refer to the Winter Recreation maps in the Forest Plan. Alternative 7 closes the Temple Fork drainage to winter motorized use to protect critical wildlife winter range. Areas of winter-motorized use along with areas of non-motorized use will continue to be allowed in specific areas of the Forest. The Forest will continue to look for ways to reduce conflicts with skiers.

686. The Wasatch-Cache National Forest should keep the Twin Creeks area closed to snowmobile use.
Response: In Alternatives 1, 2 & 6 of the Final Wasatch-Cache EIS, the Twin Creeks area is closed to winter motorized use.

687. The Wasatch-Cache National Forest should close the Amazon Basin area to snowmobile use with one travel corridor for snowmobiles.
Response: In Alternatives 1 & 2 of the Final Wasatch-Cache EIS, Amazon Basin is closed to winter motorized use.

688. The Wasatch-Cache National Forest should change proposed winter motorized areas near the Wellsville Wilderness Area to non-motorized.
Response: Winter motorized use along with non-motorized use will continue to be allowed. The Wasatch-Cache National Forest provides many types of recreational opportunities, one being snowmobile use. There will be areas of winter motorized use and areas of winter non-motorized use designed through management prescription allocations. Please refer to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in the Ogden area.

689. The Wasatch-Cache National Forest should ban snowmobiles in Public Grove or restrict them to alternate days.
Response: There will be areas of winter motorized use and areas of winter non-motorized use designed through management prescription allocations. Please refer

to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in the Logan area.

690. The final Forest Plan should adopt the proposed snowmobile closure in the Lewis Peak area.

Response: The Wasatch-Cache National Forest provides many types of recreational opportunities, one of them being snowmobile use. Winter motorized use along with non-motorized use will continue to be allowed. The Forest Service will continue to work to provide an appropriate mix of recreational uses in this area. Please refer to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in the Logan area mountains.

691. The Wasatch-Cache National Forest should prohibit snowmobiling in the Snowbasin Land Exchange lands to offset the loss of cross-country skiing opportunities on the traded lands.

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Response: Alternatives 1 & 2 significantly reduce the amount of snowmobile use across the forest including the Snowbasin Land Exchange lands. The cross-country skiing opportunities have likely increased with the addition of approximately 10,000 acres of private lands becoming public lands as a result of the Snowbasin Land Exchange.

692. The Wasatch-Cache National Forest should adopt Winter Travel Plan Alternative 3 for the Evanston District.

Response: The Wasatch-Cache Final EIS covers a broad range of Alternatives affecting winter motorized travel across the Forest. Alternative 7 was chosen to provide a even balance between motorized and non-motorized use while trying to reduce conflicts between user groups.

693. The Wasatch-Cache National Forest should close the area south of North Slope Road and the Lakes Roadless Area to snowmobile use in the absence of monitoring and complete lynx effects analysis.

Response: There will be areas of winter motorized use and areas of winter non-motorized use mapped on the Evanston-Mountain View Ranger District. The Endangered Species Act directs all government agencies to protect species listed as threatened and endangered. This includes habitat. Eleven counties in Northern Utah are included as Lynx habitat by the US Fish and Wildlife Service (FWS). The Forest will work closely with the FWS on all mitigation requirements outlined for this species.

694. The Wasatch-Cache National Forest should adopt the High Uinta Preservation Council's modified winter Recreation Opportunity Spectrum map for the North Slope which will reduce wilderness violations while leaving large open areas.

Response: Alternatives 1, 2 & 6 in the Final EIS do not allow winter-motorized use in roadless areas.

695. The Wasatch-Cache National Forest should open the North Slope of the High Uintas to snowmobiling.
Response: Many areas of the North Slope of the High Uintas are already open to snowmobiling.

695.1 Because the need statements are unsupported
Response: Please refer to the Travel Management Section in the Wasatch-Cache EIS.

695.2 Because lynx habitat requirements are not proven
Response: The Endangered Species Act directs all government agencies to protect species listed as threatened and endangered. This includes habitat. 11 counties in Northern Utah are included as lynx habitat by the US Fish and Wildlife Service (FWS.) This includes the North Slope. The Forest will work closely with the FWS on all mitigation requirements they outlined for this species.

696. The Wasatch-Cache National Forest should close the north end of the Upper South Fork Roadless Area to snowmobile use along with FR 073 and 201.
Response: Please refer to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in this area.

697. The Wasatch-Cache National Forest should prohibit winter motorized recreation in the Wasatch Front Range.
Response: Winter motorized use along with non-motorized use will continue to be allowed in selected areas along the Wasatch Front. The Wasatch-Cache National Forest provides many types of recreational opportunities, one being snowmobile use. There will be areas of winter motorized use and areas of winter non-motorized use designed through management prescription allocations. Please refer to the Winter ROS maps in the Revised Forest Plan that show which areas are open and which areas are closed to winter motorized use in this area.

698. The Wasatch-Cache National Forest should prohibit winter motorized recreation in the Tri-Canyon area.
Response: The only land where snowmobiling is allowed in the Tri-Canyon area is Guardsman's Pass. Nearly all of the land in the Guardsman's Pass area, which is open to snowmobiling, is private. The Forest Service has no jurisdiction on private lands.

699. The Wasatch-Cache National Forest should prohibit winter motorized use in the Guardmans Pass area to protect the watershed.
Response: The Forest Service has no jurisdiction over private lands.

700. The Wasatch-Cache National Forest should prohibit snowmobiling in roadless areas.
Response: The Wasatch-Cache Final EIS covers a broad range of Alternatives covering winter motorized use. Alternatives 1, 2 & 6 of the EIS prohibits motorize use in roadless areas.

701. The Wasatch-Cache National Forest should allow snowmobiling in roadless areas.
Response: The Wasatch-Cache Final EIS covers a broad range of Alternatives covering winter motorized use. Alternative's 3 & 5 of the EIS allows motorize use in roadless areas.

Travel Management – Mechanized

Mechanized – Site-Specific.

702. The Wasatch-Cache National Forest should keep the Big Water Trail open to mountain bikes.
Response: The Wasatch-Cache National Forest provides many types of recreational opportunities including mountain biking. Please refer to the Salt Lake Ranger District Travel Management Plan for specific areas that are open to mountain biking. Trail managers at the Salt Lake Ranger District will continue to evaluate the existing trail system and will implement strategies to better manage the increasing use.

Topic 4: Recreation and Scenery Management

Recreation and Scenery Management

General Management

703. The Wasatch-Cache National Forest should promote recreation as a primary goal of the Forest Plan.
Response: Recreation is recognized as one of the primary uses on the WCNF. Goals for recreation are found in the Forest Plan Chapter 4, 2. Forestwide Goals and Subgoals.

704. The Forest Service should include new language to emphasize providing beneficial recreation experiences in Guideline 41.
Response: "Beneficial recreation experiences" was added to the Recreation Guideline. See Chapter 4 Revised Forest Plan, Recreation, Guidelines for Recreation Management.

705. The Wasatch-Cache National Forest should implement the Forest Plan because it provides balanced recreation opportunities.
Response: Thank you for your comment.

706. The Wasatch-Cache National Forest should responsibly manage recreation and other forest uses.

Response: See the Revised Forest Plan, Chapter 4, Forest Management Direction. This direction is intended to take the broad conceptual goals, allocations, standards and guidelines for a number of resources and uses and fit them together in a clear complementary way, given a particular area's land capabilities, needs and opportunities.

706.1 In a balanced manner

Response: See response 706.1.

706.2 By making agency-authorized changes in forest policy.

Response: The Forest is making agency-authorized changes in forest policy to responsibly managing recreation and other forest uses by following the NEPA process. See FEIS Chapter 1 Purpose and Need.

706.3 By developing strict and enforceable standards to prohibit increased human use of the forests

Response: The alternatives of the FEIS displays a range of human uses on the WCNF based on concerns such as recreation use conflicts, biodiversity and viability. The Forest Plan contains standards and guidelines that sets limits or courses of action to protect Forest resources. The intent of Forest Plan revision is not to prohibit increased human use of the Forest but to manage the Forest Resources.

706.4 By recognizing that they do not have the resources to manage and mitigate impacts of the recreation based activities they are encouraging

Response: Thank you for your comments. The WCNF manages the Forest within the funding that is available as described in the Social and Economic analysis section of the FEIS. During the Forest Plan revision process, we consider many ways to manage the WCNF and we feel that the direction for the management of resources and mitigation of impacts is adequate to managing activities on the WCNF.

706.5 By adopting the principle of maximum tolerable impact for each visitor day

Response: We feel that this type of assessment is appropriate at a site-specific analysis and not in Forest Plan revision. This is because Forest Plan revision considers the overall broad-scale management of the Forest. Site-specific analysis and use of specific methods for determining use or impacts would become so detailed that broad-level Forest planning would not be meaningful. Broad level Forest planning is the scale expected for Forest Plan revision.

706.6 By allowing appropriate densities for motorized and non motorized routes based on ecological parameters

Response: See response 706.5.

707. The Wasatch-Cache National Forest should treat all user groups fairly.
Response: Thank you for your comment. It is the intent of the Forest Plan revision process to treat all user groups fairly.

707.1 By reallocating recreation boundaries to accommodate all recreation groups
Response: Thank you for your comment. The FEIS presents seven alternatives that have various levels of motorized and non-motorized use on the WCNF. Within these alternatives a wide variety of recreation experience is being managed for from Primitive to Urban. See Table REC-11 for acres of Summer Recreation Opportunity Spectrum, Winter Recreation Table REC-12 for acres of Winter Recreation and FEIS Chapter 2, Alternatives Considered in Detail.

707.2 By applying restrictions fairly to all user groups
Response: Trail overuse and erosional impacts are usually analyzed at the site-specific level and the WCNF tries to make decisions on these issues fairly.

707.3 By considering that favoring wilderness type activities in roadless areas only serves a narrow segment of the recreating public
Response: The alternatives of the FEIS displays a range of uses allowed on the WCNF. The revised Forest Plan takes into account the diverse recreation population by allocating areas to different uses and is not intended to favor one group over another, but to manage use on the forest to avoid conflicts and manage multiple use.

707.4 Because every activity has an impact
Response: Thank you for your comment.

708. The Wasatch-Cache National Forest should disperse recreational users.
Response: The alternatives of the FEIS display a range of allowed uses for motorized vehicles. The amount of area allowed for motorized-recreation is considered in the decision.

708.1 To lower the impact on the environment
Response: The effects of motorized recreation are analyzed for each alternative and are considered in the decision.

708.2 To lower the impacts on popular areas
Response: See response to concern statement 708.2.

709 The Wasatch-Cache National Forest should not restrict access
709.1 To avoid elitism
Response: It is not the intent of Forest Plan revision to provide opportunities for use on public lands for wealthy special interest groups. We feel that the range of use allowed on lands within the WCNF as described in the alternatives of the FEIS is in response to issues and concerns identified through public participation and

does not eliminate the public from public land and is not elitist as indicated by the range of alternatives and uses considered in the FEIS.

709.2 To protect freedom values
Response: Thank you for your comment. Forest Plan revision considers both motorized and non-motorized uses on the WCNF because Forest System lands are managed for multiple-use. The WCNF does not close roads to restrict freedom, but may do so for other purposes such as watershed protection or other non-motorized uses that are considered important. That is one of the purposes of Forest Plan revision, that is, to display alternative uses of Forest System lands based on public participation and then decide how to manage the uses.

710. The Wasatch-Cache National Forest should revise the winter recreation section in the Draft EIS to provide a more equitable and logical balance of winter recreation opportunities.
Response: The FEIS considers the balance of winter recreation use in the range of alternatives and Alternative 7 specifically addresses non-motorized recreation in the Bear River Range. See Alternative 7 Winter Recreation maps and write-up in Appendix B-6 for development of Alternative 7 Winter Recreation maps.

711. The Wasatch-Cache National Forest should develop winter recreation as one of the allocation tools used in the Forest Plan.
Response: The WCNF does consider Winter Recreation in its land allocation as described in FEIS Appendix D – Allocation Framework D-3.

712. The Wasatch-Cache National Forest should revise the Roadless Desired Condition to accommodate backcountry values, not wilderness values.
Response: Roadless Desired Condition description has been revised and states that these areas are managed according to the management prescription applied. This includes areas where motorized uses are allowed, according to the prescription, but no road construction is allowed.

713. The Wasatch-Cache National Forest should provide opportunities for quiet and solitude in ridgeline environments.
Response: The alternatives of the FEIS display a range of allowed uses that provide opportunities for quiet and solitude. The desire of the public for various uses on the WCNF will be considered in the final decision.

714. The final Forest Plan should adopt a more specific definition of "new recreation development."
Response: New recreation development has been changed to "New Campgrounds" in Comparison of Alternatives, Chapter 2, FEIS.

715. The Forest Service should include stricter criteria for new recreation development in Guideline 41.

Response: Since the issuance of the draft Forest Plan, guidelines for recreation development have been revised. We thank you for your comment. We feel that if these guidelines are tightened substantially, as you suggest, it will make it very difficult to manage recreation development for the needs of the public. We feel that concerns that are listed in your proposed guideline is best met during site-specific project implementation and that the revised Forest Plan should give broader guidance for recreation management.

Adequacy of Analysis

716. The Wasatch-Cache National Forest should adequately analyze recreational impacts.

Response: The "Guidelines for Recreation Management" were considered in the analysis of effects in the FEIS, Chapter 3 Affected Environment and Environmental Consequences.

716. 1 On wilderness

Response: The effects of activities are addressed at a broad level which is the appropriate scale for Forest Planning. See response 706.5.

716.2 By considering the impacts of future or new recreational activities, Such as paint ball.

Response: See response 706.5. The revised Forest Plan provides direction to "Manage use of new recreation technology to reduce effects on the Forest".

716.3 By determining, in cooperation with SLPU, what backcountry uses adversely impact the environment

Response: See response 706.5.

716.4 By studying all aspects of human impact on the canyons, highway, and parking capacity, and all recreation including resort and backcountry use

Response: See response 706.5.

716.5 By addressing the ecological and social impacts that result from each type of recreation and deciding which habitat type is suitable for each activity

Response: The FEIS identifies ecological and economic and social impacts of recreation activities in environmental consequences sections with primary discussions under Watershed Health and Biodiversity and Viability and Economic and Social Analysis. Regarding the concern of appropriate use of OHVs, the Forest Plan has a standard for "summer motorized and mechanized access is managed on an open on designated routes", under Standards for Road/Trail and Access Management.

716.6 By studying ways to control highway traffic and backcountry use
Response: See response 706.5.

716.7 By discarding the flawed Bradford study and using more accurate data on dispersed users
Response: The analysis that you refer to is part of a previous site-specific analysis of heli-skiing and is not part of the analysis in the Forest Plan. Multiple-use of the forest resources, including heli-skiing, is an important factor that is considered in the decisions that will be made during Forest Plan revision.

717. The Wasatch-Cache National Forest should conduct a carrying capacity analysis.
717.1 For the entire Wasatch-Cache National Forest
717.2 For the Wasatch Front Canyons
717.3 For the Tri-Canyons area
717.4 For all uses that allow for the protection of the water supply
717.5 To decide what activities to restrict or encourage
717.6 To limit the number of canyon users
717.7 To address use and plan beyond the next 15 years
717.8 Include the study in the Forest Plan immediately
717.9 Consistent with restoration and sustainability of wildlife, natural, and scenic values
717.10 Before new developments are allowed
Response: The WCNF would like to have completed a carrying capacity study for the Tri-canyons area and there are many very good reasons for doing so, but chose not to for several reasons. A carrying capacity study is a very complex process involving many different jurisdictions, partners, landowners, and users on the Forest; is mid-level assessment that is much more complicated than broad-level Forest Plan assessment; takes a large amount of time for the assessment that would take it beyond the time frame for completing the Forest Plan revision; and is not a top priority for the WCNF at this time. A carrying capacity study for the entire WCNF would be more complicated than one for the Tri-canyon area.

718. The Wasatch-Cache National Forest should establish recreation use data collection points.
Response: The Wasatch-Cache will be conducting National Use Visitor Surveys beginning in October of 2002, which will be carried through until end of September of 2003 and will repeat every 5 years there after.

718.1 For off-road vehicle users
Response: See above response to concern statement 718.1. Part of the process of Revising the Forest Plan is to review and analysis existing information that pertains to the revision. The knowledge gained from studies such as Off Highway Vehicle Use and Owner Preference in Utah (revised) January 18, 2002, Professional Report IORT PR2001-02 other reports were used in the development of this analysis.

Education

719. The Wasatch-Cache National Forest should educate the public.
719.1 On how to use and care for the land
719.2 About the effects of their activities
719.3 On the rules and the trails that are open for their use
719.4 On maintaining the 200 foot buffer around riparian areas
719.5 On low impact camping ethics
719.6 In conjunction with public school systems
719.7 Instead of restricting activities
Response: In response to comments received from the public, environmental education is now one of the main objectives of the WCNF in the next planning period. Education has always been an important part of the Forest Service nationally and locally, and it is emphasized in the revised Forest Plan in Chapter 4, Forestwide Direction, Goals and Subgoals.

720. The final Forest Plan should include specific direction to increase user education.
720.1 Through nature education programs
721.2 The Wasatch-Cache National Forest should begin an educational campaign to encourage use of quieter motorized recreational vehicles.
Response: See response 719.

Allow Activities

722. The Wasatch-Cache National Forest should allow recreational activities for environmental reasons by allowing low impact recreational activities.
Response: Thank you for your comment. Several alternatives respond to the issue of impacts by lowering the amount of impact from activities.

723. The Wasatch-Cache National Forest should allow recreational activities for social reasons.
723.1 To promote family values
723.2 To prevent crime
723.3 To accommodate the growing population
Response: Thank you for your comments. The WCNF recognizes the values of recreation on the WCNF as shown by the fact that it is one of the main issues raised in the Needs for Change and is a main topic in the FEIS and Forest Plan.

724. The Wasatch-Cache National Forest should allow recreational activities for economic reasons because of the economic benefit to adjacent communities.
Response: See concern statement 723.1. Economic analysis is contained in the Social and Economic Analysis section in the FEIS.

Do Not Allow/Restrict Activities

725. The Wasatch-Cache National Forest should control/restrict recreational activities in order to enhance and maintain other goals.
Response: The alternatives in the FEIS display a range of allowed uses in response to issues and concerns raised by the public including the amount of certain types of recreation on the WCNF. We have also addressed these through the recreation opportunity spectrum (ROS) that have a range of recreation opportunities from primitive to urban. See ROS maps for each alternative, and alternative descriptions and allowed activities for allocations in the FEIS.

726. The Wasatch-Cache National Forest should control/restrict recreational activities for environmental reasons.
726.1 To protect the environment
726.2 To protect forest health
726.3 To protect riparian areas
Response: See concern statement response 725.

727. The Wasatch-Cache National Forest should control/restrict recreational activities for social reasons because of impacts to quiet and solitude.
Response: See concern statement response 725.

728. The Wasatch-Cache National Forest should conduct seasonal recreational closures in the Elkhorn Wildlife Management Area to accommodate multiple use while protecting wildlife.
Response: We've done this where we believe it to be appropriate. If you have site-specific concerns these can be addressed during travel management planning.

729. The final Forest Plan should limit major special permit recreational events to ski area boundaries and require an EIS for permit approval.
Response: Thank you for your comment. We feel that the current language is adequate because it is broads enough to cover most events and that issues you raise such as substantial light and sound pollution should be addressed at the site-specific NEPA analysis. We feel that the level of NEPA analysis should be determined after a specific proposal is brought to the WCNF.

730. The Wasatch-Cache National Forest should prohibit parking lots, commercial development, campgrounds or vehicle routes along recreational corridors.
Response: Thank you for your comment. The range of alternatives in the FEIS addresses your concern.

731. The Wasatch-Cache National Forest should consider that "larger scale public facilities" and "modest and unobtrusive marinas" are not compatible with largely primitive and undeveloped shorelines and watersheds.
Response: Thank you for your comment.

732. The Wasatch-Cache National Forest should favor non-noise, non polluting, and non fossil fuel using recreational activities.
Response: Thank you for your comment. The range of alternatives in the FEIS addresses your concern.

User Conflict/Monitoring and Enforcement

User Conflicts

733. The Wasatch-Cache National Forest should address user conflicts.
Response: Thank you for your comment. The range of alternatives in the FEIS addresses your concern. The WCNF is considering many ways to manage user conflicts and travel management it is one of the main objectives in the revised Forest Plan.

733.1 By considering examples of how other forests have reduced winter recreational conflicts
Response: Thank you for your comment.

733.2 By protecting forest resources above user groups
Response: Thank you for your comment. One of the main sections that protect forest resources is the standards and guidelines section of the Forest Plan.

733.3 By segregating users
Response: The range of alternatives in the FEIS addresses your concern by presenting a range of allowable uses on the WCNF.

733.4 By separating hiking trails from all other users
Response: See response 733.3.

733.5 By separating foot and horse travel, motorized recreation, and research
Response: See response 733.3.

733.6 By implementing a variety of solutions to user conflicts before closing an area
Response: Thank you for the information. We feel this type of information you provided could be used as one of many tools for resolving recreation conflicts. However, we do not plan to add your recommendation to the revised Forest Plan because the WCNF does not want to have only one method in which recreation conflicts would be assessed.

733.7 In the winter
Response: Thank you for your comment.

734. The Wasatch-Cache National Forest should set aside a 1000-2000 acre preserve for summer and winter motorized recreation.
Response: Thank you for your comment.

735. The Wasatch-Cache National Forest should not segregate users because everyone should have equal opportunity to use public lands.
Response: Thank you for your comment. The WCNF recognizes that there are conflicts between users and the Forest will try to make the best decision it can given the many view points of the users.

736. The Wasatch-Cache National Forest should recognize that the plan does little to resolve user conflict and current Draft EIS designations are likely to increase them.
Response: Thank you for your comment.

Monitoring and Enforcement

737. The Wasatch-Cache National Forest should monitor motorized recreation and enforce regulations.
Response: The WCNF are conducting visitor use surveys and uses studies such as noted in Comment 718.1. The WCNF enforces regulations according to the law.

737.1 According to executive orders and the National Forest Management Act
Response: Recent studies that evaluate motorized use in northern Utah have been used in the Recreation effects section of the FEIS.

737.2 For multiple reasons
Response: Thank you for your comment. The range of alternatives in the FEIS addresses your concern by presenting a range of allowable uses on the WCNF.

737.3 To prevent environmental damage
Response: Thank you for your comment. See response 733.

737.4 To prevent ghost roads
Response: Thank you for your comment.

737.5 For both winter and summer recreation
Response: Thank you for your comment.

737.6 Don't let a few spoil it for the rest
Response: Thank you for your comment.

737.7 Because opening more areas to motorized vehicles will only increase the problem
Response: Thank you for your comment. See response 733.

737.8 Instead of restricting motorized activities
Response: Thank you for your comment. See response 733.

738. The Wasatch-Cache National Forest should monitor motorized recreation and enforce regulations in certain areas.
738.1 In wilderness and roadless areas
738.2 Restrict access adjacent to wilderness
738.3 Enforce Mount Naomi Wilderness Area boundaries
738.4 In Green Canyon
738.5 Northern Central Bear River Range
738.6 East Slopes of Mount Naomi Wilderness
738.7 Temple Fork area
Response: Monitoring for motorized recreation and enforcement of regulations are addressed in several areas of the Forest Plan. The Objective for Education and Enforcement in the revised Forest Plan intends to integrate key messages that teach appropriate behavior while using the forest. The focus areas for key messages include OHV use with a purpose of reducing conflicts between recreation users. One of the items in the revised Forest Plan monitoring plan is monitoring to determine if the WCNF is delivering key education/enforcement messages that include OHV use. It also has monitoring to determine whether the WCNF is providing recreational opportunities for both motorized and nonmotorized users while protecting and restoring watersheds, providing for the needs of wildlife. The monitoring section identifies indicators and how to measure the monitoring items that includes the use of surveys. When surveys are set up for monitoring, specific areas will be identified and the areas described in Comments 738.1 through738.7 will be considered at that time.

739. The Wasatch-Cache National Forest should monitor and enforce snowmobile regulations.
739.1 On public lands
739.2 In Cardiff Fork
739.3 West of Tony Grove
739.4 Issue citations to violators
Response: See response 738. When surveys are set up for monitoring, specific areas will be identified and considered at that time. Forest law enforcement officers have the authority to issue citations when people violate the law. This is one of the methods the WCNF uses to assist in compliance with the law.

740. The Wasatch-Cache National Forest should have personnel on the Big Water Trail on the no-bike days to monitor illegal use.
Response: Thank you for your comment. The Objective for Education and Enforcement in the revised Forest Plan intends to address this type of problem. Your comment will be sent to the Ranger District and means to address it will be considered.

741. The Wasatch-Cache National Forest should patrol, monitor, and educate dispersed campers
741.1 In the area south of Highway 89 to Temple Fork
741.2 And minimize inappropriate off-road travel and ghost roads
Response: Thank you for your comment. The Objective for Education and Enforcement in the revised Forest Plan intends to address this type of problem. When surveys are set up for monitoring and plans developed for patrolling and education, specific areas will be identified and considered at that time.

742. The Wasatch-Cache National Forest should enforce the Forest Plan by using more signs.
Response: Thank you for your comment. The Objective for Education and Enforcement in the revised Forest Plan intends to address this type of problem. Signing is one of the methods by which to meet this objective.

743. The Wasatch-Cache National Forest should increase enforcement of motorized travel rules rather than build new logging roads and motorized trails.
Response: Thank you for your comment. The WCNF considers how to allocate funds to meet the needs of the forest.

744. The Wasatch-Cache National Forest should add a monitoring method for reducing user conflicts.
Response: The revised Forest Plan has included monitoring to address user conflicts such as the monitoring item that determines whether the WCNF is providing recreational opportunities for both motorized and nonmotorized users while protecting and restoring watersheds, providing for the needs of wildlife.

745. The Wasatch-Cache National Forest should add a monitoring method for stewardship education efforts.
Response: Monitoring to address this objective is included in the monitoring plan of the revised Forest Plan.

746. The Wasatch-Cache National Forest should not assume non-compliance increases with increased user numbers. Some problems can be mitigated.
Response: We have seen many more user created ATV trails in just the last couple of years and that has happened at the same time as a large increase in numbers of ATV users. An objective of the revised Forest Plan is to provide recreational opportunities for both motorized and nonmotorized users while protecting and restoring watersheds, providing for the needs of wildlife.

747. The final Forest Plan should not increase its enforcement problems by closing additional areas to recreational users.
Response: Enforcement and signing are ways to implement the Forest Plan. The Forest Plan has an objective of providing recreational opportunities for both motorized and nonmotorized users while protecting and restoring watersheds,

providing for the needs of wildlife. The alternatives give a range of allowed activities that have varying amounts of area closed to certain activities.

User Regulations

748. **The Wasatch-Cache National Forest should require off-road vehicles to have license plates that are readable.**
748.1 In conjunction with the state of Utah
748.2 To facilitate identification of rule violators
Response: Thank you for your comment on ways to help implement the Forest Plan. Comments such as yours will be considered when the WCNF considers specific ways to assist users in complying with Travel Plans.

749. The Wasatch-Cache National Forest should impose strict noise standards and speed limits.
Response: The FEIS addresses the issue of noise by separating the motorized and non-motorized uses. Travel planning is the time when these issues should be addressed because the large variation across the WCNF makes it not appropriate to address at the Forest Plan scale.

750. The Wasatch-Cache National Forest should impose a 5 mph speed limit near campgrounds to minimize dust.
Response: Thank you for your comment. A Forest-wide goal is for a roads and Trails system that is safe, responsive to public and agency needs.

751. The Wasatch-Cache National Forest should impose noise and clean engine restriction,s rather than close areas to motorized recreation.
Response: Thank you for your comment. In the section Effects of Recreation on Recreation under Topic Recreation /Scenic Management in the FEIS, the WCNF recognizes that new technology is available to make snowmobiles quieter and cleaner. This will be considered along with many factors when the decision is made.

752. The Wasatch-Cache National Forest should impose temporary or permanent closure of access to areas that result in frequent motorized trespassing.
Response: The WCNF recognizes this issue and addresses it with goals to increase Forest Service field presence in key areas, improve effectiveness of public information on restrictions, and increase participation of individuals and organized groups in monitoring uses in the Forest Plan Forestwide Subgoal- Road/Trail and Access Management and Forestwide Goal 8– Enforcement.

Motorized Recreation

Motorized Recreation General

753. The Wasatch-Cache National Forest should provide more information about motorized recreation opportunities to comply with the requirements of environmental justice.
Response: Information concerning motorized recreation opportunities are found on the ROS maps per each alternative and discussed in the FEIS, chapter 3, Topic 4-Recreation/Scenery Management.

754. The Final EIS should address compliance with P.L. 105-359 to improve outdoor recreational access for the disabled.
Response: This is National direction and the Forest is working to comply with the direction. See Revised Forest Plan, Chapter 4, Recreation, Desire Condition.

Cumulative Impacts on Motorized Recreationists

755. The Wasatch-Cache National Forest should evaluate the cumulative impact of the proposed action and other decisions on environmental justice and the standards of living for multiple-use and motorized visitors.
Response: See response 753.

756. The Wasatch-Cache National Forest should evaluate the social and economic impact to motorized recreationists of not having recreational opportunities in the nearby forests.
Response: See response 753.

757. The Wasatch-Cache National Forest should evaluate the cumulative impacts and environmental justice issues surrounding the lack of national motorized trails on motorized recreationists. And then, identify and implement measures necessary to mitigate these impacts on motorized recreationists.
Response: See response 753.

758. The Wasatch-Cache National Forest should determine the number of miles of off-road vehicle trails versus the miles of trails and acres of cross-country travel opportunities to address the cumulative effects on motorized recreationists.
Response: This information on the numbers of roads on the Forest is displayed in the affected environment under Topic 3 - Roads and Access management and trails under Topic 4 – Recreation /Scenery Management. There currently are no cross-country travel opportunities since all of the District travel plans allow summer motorized use only on designated roads and trails. Motorized cumulative effects is addressed in the Cumulative Effects section under Topic 4 – Recreation /Scenery Management.

759. The Wasatch-Cache National Forest should consider the U.S. Department Of Transportation document, "Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice." because it is an excellent resource on user conflict and trail sharing.
Response: Thank you for this internet reference site.

Allow Motorized Recreation

760. The Wasatch-Cache National Forest should allow motorized use.
760.1 In roadless areas
760.2 Except in areas where it interferes with wildlife
760.3 For tourism
760.4 Because motorized use is a legitimate activity
Response: The WCNF allows motorized use in many areas and the various alternatives provide a range of motorized vehicle use that may be considered by the decision maker.

761. The Wasatch-Cache National Forest should not close roads and trails to motorized use for environmental reasons because motorized users don't harm the environment.
Response: The WCNF must consider the effects of roads and trails based on significant issues that are raised, including environmental issues. Most road closures are a result of site-specific analysis and during Travel Plan updates at which time specific information is reviewed to make a determination on whether to close or not close a road.

762. The Wasatch-Cache National Forest should not eliminate access based on premature decisions about lynx, bear, and wolves. The Canada Lynx should not be used as an excuse to stop motorized use.
Response: See response 753.

763. The Wasatch-Cache National Forest should open a new motorized route for every route closed to avoid further cumulative impacts to motorized recreationists.
Response: The WCNF considers issues and effects of roads and trails on resources and the public when it evaluates whether to close or not close a road. Using criteria such as a new motorized route should be opened for every closed route does not provide a good process for evaluating issues related to access management.

Do Not Allow/Restrict Motorized Recreation

764. The Wasatch-Cache National Forest should prohibit/restrict motorized recreation.
764.1 In roadless areas
764.2 In sensitive areas
764.3 In riparian areas

764.4 In the backcountry
764.5 Because it affects non-motorized users' quality of experience
764.6 Because it will be harder to restrict uses in the future
764.7 Because there are many opportunities elsewhere in Utah
764.8 For anything but emergency use
764.9 Don't support the use of petroleum products
Response: Thank you for your comments. The FEIS address these concerns in the various alternatives, particularly Alternatives 1 and 2, and the effects are analyzed in the section on Environmental Effects of Recreation on Recreation in Topic 4 – Recreation /Scenery Management.

765. The Wasatch-Cache National Forest should proscribe future motorized uses in roadless areas where there are no motorized uses now.
Response: Thank you for your comments. The FEIS address these concerns in the various alternatives, particularly Alternatives 4 and 5, and the effects are analyzed in the section on Environmental Effects of Recreation on Recreation in Topic 4 – Recreation /Scenery Management.

766. The Wasatch-Cache National Forest should close large blocks of land around roadless and wilderness areas and entire watersheds to protect the environment from motorized users.
Response: The FEIS address these concerns in Alternative 1 by prescribing large areas of the WCNF for ensuring biodiversity and species viability including watershed functions.

767. The Wasatch-Cache National Forest should not allow motorized use right up to wilderness boundaries to meet the National Strategic goal.
Response: Thank you for your comment and reference to the USFS National Strategic Goals. Section 303 of The Utah Wilderness Act of 1984 (Public Law 98-428) prohibits buffer zones around designated wilderness areas in the State of Utah. It states that " The fact that nonwilderness activities or uses can be seen or heard from areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area." The WCNF abides by this law when managing areas adjacent to wilderness areas in the State of Utah.

768. The Wasatch-Cache National Forest should limit motorized zones to areas where natural features make cross-country travel impossible.
Response: Thank you for your comment. During travel planning analysis, characteristics of the landscape such as steepness are considered for where motorized travel is allowed. Currently, there are no cross-country travel opportunities since all of the District travel plans allow summer motorized use only on designated roads and trails. The alternatives of the FEIS have a range of areas where motorized use is allowed that is based on issues that were raised during the Forest Plan revision.

Motorized Recreation – Off-Road Vehicles

Motorized Recreation – Off-Road Vehicles General

769. The Wasatch-Cache National Forest should consider off-road vehicles and motorcycles separately.
Response: The FEIS and revised Forest Plan revision places motorcycles and ATVs in the same category of vehicles because planning is at a broad scale. Separating these vehicle types would be appropriate for site-specific analysis during District travel planning.

770. The Wasatch-Cache National Forest should manage off-road vehicles.
770.1 By developing comprehensive management strategies
770.2 According to the Motorcycle Industry Council triangle of education-opportunity-law enforcement
Response: The FEIS and revised Forest Plan recognizes the issue of managing off-road vehicles in section Road/Trail and Access Management under Forestwide Subgoals, and in sections Objectives for Education and Enforcement and Objectives for OHV and Non-motorized Travel Management under Forest-wide Objectives of the revised Forest Plan. The revised Forest Plan sets the goals and objectives of developing a plan for addressing these issues but does not develop the specific strategies to accomplish it.

771. The Wasatch-Cache National Forest should develop a travel plan for summer motorized vehicles to prevent resource damage.
Response: Travel plans have been completed recently for Kamas RD, Salt Lake RD, Ogden and Logan RD and the Evanston/Mt. View RD will have a revised travel plan very soon. Also, See response 770.

772. The Wasatch-Cache National Forest should that consider more resources are needed to manage motorized recreation because of environmental impacts on the Logan Ranger District.
Response: See response 770.

773. The Wasatch-Cache National Forest should conduct public outreach with motorized recreationists to fairly present their needs.
Response: The WCNF has provided public participation throughout the Forest Plan revision process. Many of the people who attended public meetings and who gave many comments are motorized recreationists. Through our public participation efforts we feel we have given more than adequate ability to express opinions and comments on how to manage the WCNF.

774. The Wasatch-Cache National Forest should manage off-road vehicle use rather than close areas because motorized users will ignore closures.
Response: See response 770.

Adequacy of Analysis

775. The Wasatch-Cache National Forest should conduct a National Environmental Policy Act analysis for any off-road vehicle use.
Response: The WCNF is required to conduct a NEPA analysis on all proposed projects. District travel plans provide the site-specific NEPA analysis for where OHV use is allowed on the WCNF.

Education

776. The Wasatch-Cache National Forest should alter the Preferred Alternative to include more management and education pertaining to off-road vehicle in the forest.
Response: Thank you for your comment. As a result of comments such as yours, the WCNF has developed goals and objectives that focus on education and enforcement of OHV use. See response 770.

777. The Wasatch-Cache National Forest should require all off-road vehicle riders to take a course for a permit to ride on the forest.
Response: The State of Utah has training courses for operators of OHVs. We feel that it is best that the State of Utah and not the USFS be responsible for OHV training and certification.

Allow Off-Road Vehicles

778. The Wasatch-Cache National Forest should allow off-road vehicles.
778.1 For multiple use
778.2 Because the majority of the public supports it
778.3 Because off-road vehicle use is increasing
778.4 Do not make it an illegal activity
Response: The FEIS addresses the issue of OHV use in the section Effects of recreation on Recreation under Topic 4 – Recreation / Scenery Management. The alternatives provide a range of allowed uses by OHVs and the decision will consider those concerns that you have expressed. Also see response 770.

779. The Wasatch-Cache National Forest should allow off-road vehicles for environmental reasons.
779.1 Because all terrain vehicles are environmentally safe and do not impact the scenery
779.2 To protect wetlands
779.3 Do not use sound level to justify motorized closures
779.4 Because motorized users don't harm the environment
779.5 Because only those who cause damage should be punished
779.6 Because education of motorized users is working
779.7 Because motorized access leads to higher public appreciation of nature
Response: See response 778.

780. The Wasatch-Cache National Forest should allow off-road vehicles for economic reasons. This should be allow in areas where jobs have been lost.
Response: The FEIS recognizes the contribution of OHV use to the economy in the Social and Economic Analysis.

781. The Wasatch-Cache National Forest should allow off-road vehicles for social reasons.
781.1 For families
781.2 For the disabled and elderly
781.3 For future generations
781.4 For safety or emergency use
781.5 For intrinsic values
Response: Thank you for your comment. The FEIS recognizes that OHV use is important to many people for many reasons in the recreation issues, alternatives, and effects section Effects on Recreation from Recreation under Topic 4 Recreation/Scenery Management.

782. The Wasatch-Cache National Forest should allow off-road vehicles in certain areas.
782.1 In roadless areas
782.2 In remote and primitive areas where some degree of challenge is found
Response: The alternatives in the FEIS contain a range of areas where summer motorized recreation is allowed, including alternative with prohibition in roadless areas. The revised Forest Plan contains an objective for OHV management that includes the need to update Travel plans on some Districts and to provide opportunities for OHV use such as loop trails and adequate amount of trails.

783. The Wasatch-Cache National Forest should allow off-road vehicles by maintaining access.
783.1 By keeping areas open
783.2 By keeping the current level of motorized access
783.3 By opening more trails to motorized users
783.4 By increasing the acreage open to motorized use
783.5 By providing equal opportunity for motorized and non-motorized uses
783.6 By developing logging and pioneer roads for all off-road vehicles
783.7 By expanding public areas for play areas and trials bikes
Response: Thank you for your comment. The alternatives in the FEIS contain a range of areas where summer motorized recreation is allowed. This range was developed in response to issues raised about the management of the WCNF. Also See responses 781 and 782.1.

Do Not Allow/Restrict Off-Road Vehicles

784. The Wasatch-Cache National Forest should prohibit/restrict off-road vehicles for environmental reasons.
784.1 To protect remote areas

784.2 To protect watersheds
784.3 To prevent erosion-prone user-created trails
784.4 Because of the cumulative impact as a result of the exponential increase in numbers of motorized users
784.5 Because opening more areas will increase degradation
784.6 Because users often inflict more damage over a larger area
784.7 Because of noise and air pollution
784.8 Because of disturbance to nesting birds
784.9 Because of impacts to the reproductive success of birds
Response: The FEIS recognizes that many people for various reasons feel that OHV use should be prohibited or restricted in the section Effects on Recreation from Recreation under Topic 4 Recreation/Scenery Management and in Effects on Soil and Water Resources from Recreation under Topic 1 Watershed Health. The FEIS recognizes that motorized use effects wildlife as described in section Effects on Terrestrial Wildlife from Recreation under Topic 2 –Biodiversity and Viability.

785. The Wasatch-Cache National Forest should prohibit/restrict off-road vehicles for social reasons because many elderly people like non-motorized activities.
Response: See response 784.

786. The Wasatch-Cache National Forest should control off-road vehicles through restrictions.
786.1 By seasonal restrictions
786.2 By controlling use during the spring runoff
786.3 By restricting to existing paved roads and non-paved roads that currently have significant use
786.4 By closing/restricting areas until it can be demonstrated that there is no environmental impact
786.5 By temporarily closing access to areas experiencing use by vehicles off of designated routes until further analysis
786.6 By either requiring off road vehicles to conform to pollution regulations or keeping them out of canyons
786.7 By adding a standard to prohibit off-road and off-trail cross country travel
786.8 By having a trail policy of closed unless posted open
786.9 By limiting group size to six to eight
786.10 By prohibiting vehicles on dirt roads in the Cottonwood Canyons, except for property owners
Response: There currently are no summer motorized cross-country travel opportunities since all of the District travel plans allow summer motorized use only on designated roads and trails. The revised Forest Plan has a standard for “summer motorized and mechanized access is managed on an open on designated routes”, under Standards for Road/Trail and Access Management. Travel Plans also have information on proper OHV use in the Tread Lightly section. Other travel management issues should be resolved at the site-specific Travel Plan analysis because specific information needs to be analyzed such as access requirements

through public land, ski area management needs, and access to campgrounds. See also response 770.

787. The Wasatch-Cache National Forest should not expand public areas for activities like rock crawls and trials because it can damage the visual environment.
Response: See response 786

Motorized Recreation – Snowmobiles

Motorized Recreation – Snowmobiles General.

788. The Wasatch-Cache National Forest should develop a designation other than roadless for the type of terrain snowmobilers use because snowmobiles don't use roads.
Response: Roadless is inventory not a designation of any type of use. The Forest uses the designation winter motorized for terrain that snowmobilers use.

789. The Wasatch-Cache National Forest should change Guideline G47 to a Standard and increase the snow depth required for winter motorized use.
Response: Currently, scientific studies are limited on the effects of compacted snow due to snowmobiling. These studies have shown there can be some effects. Whether or not these effects are significant has not been clearly established. The Guideline referring to snow depth is G54. This will remain a Guideline and the depth will remain the same.

790. The Wasatch-Cache National Forest should eliminate bias in the proposed Forest Plan toward motorized recreation.
Response: The Forest Plan and accompanying EIS cover a broad range of alternatives. For example alternatives 1 & 2 significantly reduce the amount of roads and terrain open to motorized recreation. Alternative 3 expands the amount of roads and terrain open to motorized recreation.

Adequacy of Analysis

791. The Wasatch-Cache National Forest should address the potential environmental impacts of having massive areas of compacted snow due to snowmobile use.
Response: Currently, scientific studies are limited on the effects of compacted snow due to snowmobiling. These limited studies have shown there can be some effects. Whether or not these effects are significant relative to normal snow compaction has not been clearly established.

792. The Wasatch-Cache National Forest should re-evaluate whether snowmobile use should be allowed when snow cover is less than or equal to 12 inches because of environmental impacts.

Response: Currently, scientific studies are limited on the effects of compacted snow due to snowmobiling. These limited studies have shown there can be some effects. Whether or not these effects are significant relative to normal snow compaction has not been clearly established. When new, relevant scientific evidence indicating adverse effects, the depth and impacts will be re-evaluated.

793. The Wasatch-Cache National Forest should incorporate new data into travel management planning about the effects of 2-stroke engines on the environment.
Response: Current data has been incorporated in the analysis for the Forest Plan and EIS. At such time as new data becomes available it will be looked at and analyzed.

794. The Wasatch-Cache National Forest should evaluate the potential for snowmobile pollution, especially evaluate the impacts of pollution to watersheds.
Response: This topic is discussed in Section 3 under Environmental Consequences in the Final EIS.

795. The Final EIS should include an analysis of the effects of snowmobiling on air quality, watersheds, and wildlife habitat.
Response: This topic is discussed in Section 3 under Environmental Consequences "Effects on air Quality from Snowmobiles."

796. The Wasatch-Cache National Forest should adequately evaluate the impact of snowmobiling in the Lakes backcountry.
Response: This topic was adequately discussed in Topic 3 Roads Access Management and Topic 4 Recreation and Scenery Management in the Final EIS.

797. The Wasatch-Cache National Forest should determine the limits of snowmobile use due to impacts on wintering wildlife.
Response: The Forest continues to monitor winter motorize use areas. These areas are mapped in the Final EIS as well as in the Revised Forest Plan. Please refer to these maps for determining the limits of snowmobile use on the Forest. Winter motorized use and wildlife winter ranges have been looked at relative to each other and adjustments to terrain available for motorized use were made.

Allow Snowmobiles

798. The Wasatch-Cache National Forest should allow snowmobiles.
Response: The Wasatch-Cache National Forest will continue to provide a wide range of recreational opportunities both winter motorized and winter non-motorized use through management prescription allocations. Mapping of Winter Motorized use terrain is displayed in winter recreation mapping in the Revised Forest Plan.

798.1 By preserving the level of snowmobiling opportunity that exists today.
Response: Alternatives 3 and 5 in the Wasatch-Cache Final EIS increase the amount of snowmobiling opportunity available in the Forest EIS, alternative 4 keeps the level of snowmobiling opportunity the same while Alternative 6 does not allow snowmobile use in recommended wilderness. Alternative 7 in the EIS allows snowmobile use in recommended wilderness.

798.2 By providing specific areas for snowmobilers and parking.
Response: The Forest does provide areas for snowmobilers and non-snowmobilers alike. Please Refer to Topic 4 Recreation Management in the Final EIS for a discussion of this issue. In addition, refer to winter recreation maps in the Revised Forest Plan.

798.3 If the final plan recommends additional wilderness.
Response: The current plan will allow winter motorized use to continue in newly proposed Wilderness in areas where it was allowed previously before the proposed Wilderness management prescription.

799. The Wasatch-Cache National Forest should allow snowmobiles for environmental reasons.
799.1 Because snowmobiles do not cause any environmental damage.
799.2 Because the Draft EIS has not proven any measurable impact or coflicts.
799.3 Because snowmobiles do not harm wildlife.
Response: The Forest will continue to allow snowmobiles in areas designated for winter-motorized use. Please refer to the winter recreation maps in the Revised Forest Plan showing areas open to winter motorized use. **See also response 798.**

800. The Wasatch-Cache National Forest should allow snowmobiles for social reasons because they are needed for search and rescue.
Response: Please refer to Topic 4 Recreation and Scenery Management in the Final Environmental Impact Statement and look at table REC-12 for the amount of acres open to snowmobiling by alternatives.

801. The Wasatch-Cache National Forest should allow snowmobiles for economic reasons because snowmobilers contribute to the economy and money for trail grooming.
Response: The Forest will continue to allow snowmobiling. The economic effects of snowmobiling are discussed in Appendix B11 of the Final Environmental Impact statement. Please refer to the Social and Economics Section of the FEIS for a discussion of the economic effects of snowmobiling on local economies.

802. The Wasatch-Cache National Forest should allow snowmobiles in certain areas.
Response: See response 798
802.1 In inventoried roadless areas.

Response: The Forest Plan and FEIS cover a broad range of alternatives. Some alternatives increase the amount of winter motorized acreage such as Alternatives 3 & 5 and some alternatives decrease the amount of acreage available for winter motorized use such as in alternatives 1 & 2. Alternative 6 does not allow snowmobiling in recommended Wilderness. Alternative 7, the preferred alternative, allows snowmobiles in recommended Wilderness. The final decision will try to balance an appropriate mix of winter motorized and winter non-motorized terrain.

802.2 In all currently open areas.
Response: The Forest Plan and FEIS cover a broad range of alternatives. Some alternatives increase the amount of winter motorized acreage and some alternatives decrease the amount of acreage available for winter-motorized use. The final decision will try to a balance an appropriate mix of winter motorized and winter non-motorized terrain.

802.3 Re-open winter non-motorized areas on the Uinta's North Slope.
Response: See response 802.

802.4 Open semi-primitive non-motorized areas to snowmobile use seasonally.
Response: Areas with a Semi-primitive Non-Motorized ROS Classification will remain closed to motorized use.

802.5 In the Bunchgrass area east of Tony Grove Lake and the area east of Swan Peak and south of Swan Lake.
Response: The Forest Plan and FEIS cover a broad range of alternatives. Some alternatives increase the amount of winter motorized acreage and some alternatives decrease the amount of acreage available for winter-motorized use. Alternatives 3, 5 & 6 allow snowmobiling in this area.

802.6 In Garden City Canyon.
Response: The Forest Plan and FEIS cover a broad range of alternatives. Some alternatives increase the amount of winter motorized acreage and some alternatives decrease the amount of acreage available for winter-motorized use. Alternatives 3, 5 & 6 allow winter motorize use in the Garden City Canyon area.

803. The Wasatch-Cache National Forest should not reduce winter motorized acreage because user numbers are increasing.
Response: The Forest Plan and FEIS cover a broad range of alternatives. Some alternative increase the amount of winter motorized acreage and some alternatives decrease the amount of acreage available for winter motorized use. Alternatives 3 & 5 increase the number of acres available for winter motorized use. Alternative 7, the preferred alternative, allows snowmobile use in recommended Wilderness.

804. The Wasatch-Cache National Forest should not restrict winter motorized use because of economic impacts.
Response: Snowmobile use, along with many other recreational uses, is and will continue to be an allowed form of recreation on the Wasatch-Cache National Forest. The Wasatch-Cache National Forest will continue to provide a wide range of recreational opportunities both winter motorized and winter non-motorized use through management prescription allocations, Recreational Opportunity Spectrum (ROS) Classification, and subsequent winter recreation management.

805. The Wasatch-Cache National Forest should not restrict snowmobiles based on the application of the Canadian Lynx Conservation Assessment, until conclusive studies have been completed within the appropriate lynx analysis units.
Response: The Endangered Species Act directs all government agencies to protect species listed as threatened and endangered. This includes habitat. Eleven counties in Northern Utah are included as lynx habitat by the US Fish and Wildlife Service (FWS) The Forest will work closely with the FWS on all mitigation requirements outlined for this species.

806. The Wasatch-Cache National Forest should allow continued winter access to a variety of locations by snowmobile, helicopter and snow cat for the purpose of monitoring snowpack conditions and forecasting snow runoff.
Response: The Revised Forest Plan will continue to allow access for the purpose of monitoring snowpack conditions for forecasting snow runoff.

Do Not Allow/Restrict Snowmobiles.

807. The Wasatch-Cache National Forest should prohibit/restrict snowmobile use. Completely ban all winter motorized vehicles until resources for policing the areas can be increased.
Response: Snowmobile use, along with many other recreational uses, is and will continue to be an allowed form of recreation on the Wasatch-Cache National Forest. The Wasatch-Cache National Forest will continue to provide a wide range of recreational opportunities both winter motorized and winter non-motorized use through management prescription allocations, Recreational Opportunity Spectrum (ROS) Classification, and subsequent winter recreation maps. The Forest will continue to enforce applicable laws and regulations for winter-motorized use to the level allowed by current budgets and personnel available for enforcement tasks.

808. The Wasatch-Cache National Forest should prohibit/restrict snowmobile use for environmental reasons.
808.1 Because of off-road snowmobiling impacts.
808.2 Because of noise and air pollution.
808.3 Because of impacts to wildlife.
808.4 Because of impacts to threatened, endangered, and sensitive species.

Response: This topic was discussed in several areas including Chapter 3-Affected Environment, Forest-wide recreation and Environmental Consequences under Topic 2- Biodiversity and Viability.

809. The Wasatch-Cache National Forest should prohibit/restrict snowmobile use for social reasons.

809.1 Because it impacts social values.

809.2 Because it caters to the wealthy.

Response: Snowmobile use, along with many other recreational uses, is and will continue to be an allowed form of recreation on the Wasatch-Cache National Forest. The Wasatch-Cache National Forest will continue to provide a wide range of recreational opportunities both winter motorized and winter non-motorized use through management prescription allocations, Recreational Opportunity Spectrum (ROS) Classification, and subsequent winter recreation maps. The Forest will continue to enforce applicable laws and regulations for winter-motorized use to the level allowed by current budgets and personnel available for enforcement tasks. The FEIS examines a range of Alternatives for separation of winter motorized and non-motorized uses.

810. The Wasatch-Cache National Forest should prohibit/restrict snowmobile use in certain areas.

810.1 In roadless areas

810.2 In the Lily Lake Cross-country Ski Area expansion

810.3 On the east slopes of Mount Naomi.

Response: All of the Alternatives in the Final EIS restrict snowmobiles to certain areas to a great extent. Alternatives 1, 2 & 6 in the Wasatch-Cache Final EIS significantly restrict winter motorized use in specific areas across the forest. Alternative 1 restricts winter motorized use in roadless areas. Alternatives 1 & 2 in the Wasatch-Cache Final EIS restricts use in the Lily Lake Cross-country Ski Area. Alternatives 1, 6 and 7 in the Wasatch-Cache Final EIS restricts use on the east slopes of Mount Naomi.

811. The Wasatch-Cache National Forest should control snowmobiles through restrictions.

Response: There are restrictions on winter motorized use on the Forest.

811.1 Restrict to currently open areas.

Response: Alternative 4 in the Wasatch-Cache Final EIS leaves winter motorized use the same.

811.2 Don't open new areas

Alternative 4 in the Wasatch-Cache Final EIS leaves winter motorized use the same.

811.3 Broaden Guideline 34 to allow more flexibility for imposing winter recreational closures.
Response: Guideline 34 was changed to Guideline 39 in the Revised Forest Plan and has remained the same.

811.4 Impose seasonal restrictions.
Response: Winter motorized use is controlled through winter recreation management described in the Revised Forest Plan under Forestwide Allocations-Winter Recreation. Winter recreation management begins when there is 12 inches of snow present on the ground.

811.5 Close areas with potential lynx habitat to winter motorized use.
Response: The Endangered Species Act directs all government agencies to protect species listed as threatened and endangered. This includes habitat. Eleven counties in Northern Utah are included as lynx habitat by the US Fish and Wildlife Service (FWS). The Forest will work closely with the FWS on all mitigation requirements outlined for this species.

811.6 Regulate user numbers
Response: Regulating users is one tool to regulate use. The Forest will continue to manage winter motorized use through standards and guidelines, management area prescriptions, ROS and winter recreation management strategies. Please refer to Chapter 4 of the Revised Forest Plan under Forest Wide Allocations and in Management Area Prescriptions for a description on how Winter Motorized use will be managed.

812. The Wasatch-Cache National Forest should not issue a special use permit to snowmobilers in Cardiff Fork to access mining claims because snowmobiles are not using these permits legitimately.
Response: The Forest Service is required to provide “reasonable” access to a person owning private land surrounded by National Forest. Special Use Permits (SUP) are issued to the private landowner allowing them to cross National Forest so that they are able to access their private land. The Forest Service needs to continue to make sure all persons who are allowed to access their private land through a SUP are complying with the terms and conditions set out in that SUP. Several courses of action are available to the SUP administrator if the SUP holder is violating the terms of the SUP.

Motorized Recreation – Heli-skiing

Motorized Recreation – Heli-skiing General

813. The Wasatch-Cache National Forest should use the description from the Forest Plan to define the area of permitted heli-ski terrain to be exchanged.
Response: The terrain where helicopter skiing is allowed is well described in the Special Use Permit allowing this activity to occur. In addition, helicopter ski terrain

is well described by alternative in the Final EIS and in the Revised Forest Plan Winter Recreation Maps. Please refer to the September1999 Environmental Impact Statement completed for the helicopter skiing permit renewal.

Adequacy of Analysis.

814. The Wasatch-Cache National Forest should explain the issue of eliminating recreational helicopter activities to allow eagles to effectively reproduce in the Tri-Canyons.
Response: A thorough analysis was completed on the effects of helicopter skiing on nesting raptors in the September1999 Environmental Impact Statement on Wasatch Powderbird Guides helicopter skiing permit renewal.

Allow Heli-skiing.

815. The Wasatch-Cache National Forest should allow heli-skiing because it is good for everyone.
815.1 Because eliminating this activity is in contrast to stated forest goals.
815.2 For multiple use.
815.3 Since the cumulative impacts of the EIS and the Special Use Permit (SUP) may have already placed the future of this activity in jeopardy.
815.4 By allowing heli-skiing on Sunday and Monday.
Response: This issue was thoroughly analyzed in the September1999 Environmental Impact Statement completed for the helicopter skiing permit renewal. Wasatch-Powderbird Guides will continue to operate under the terms and condition of their 5-year Outfitter and Guide SUP.

816. The Wasatch-Cache National Forest should allow heli-skiing for environmental reasons because it does not harm the environment because noise is a minimal impact.
Response: See response 815.

817. The Wasatch-Cache National Forest should allow heli-skiing for social reasons.
817.1 For safety.
817.2 For the disabled.
Response: See response 815.

818 The Wasatch-Cache National Forest should allow heli-skiing for economic reasons because of its impact to the economy.
Response: See response 815.

819. The Wasatch-Cache National Forest should allow heli-skiing in certain areas.
819.1 In wilderness areas.
Response: The Wilderness Act prohibits motorized use in Wilderness areas.

819.2 In the Cascade area.

Response: The Uinta NF allows heli-skiing in the Cascade Ridge area.

819.3 In Mill Creek Canyon.
Response: Helicopter skiing is allowed in the Gobblers Knob area of Millcreek Canyon.

820. The Wasatch-Cache National Forest should allow Wasatch Powderbird Guides heli-skiing use.
820.1 Because they are stewards of the environment.
820.2 Because they contribute to the economy.
820.3 Do not discriminate against the Wasatch Powderbird Guides.
Response: The Revised Wasatch-Cache Forest Plan allows helicopter skiing to continue on the Forest under a 5-year SUP. The Forest Service does not discriminate against any Outfitter and Guide permittee.

Do Not Allow/Restrict Helis-skiing

821. The Wasatch-Cache National Forest should prohibit/restrict heli-skiing.
821.1 By the year 2004
821.2 Terminate or phase out helicopter permits.
821.3 Because there is ample opportunity on private land.
821.4 If allowed, make them fly farther to avoid areas frequently accessed by others.
Response: The Forest Plan provides broad program-level direction for management of the land and its resources. The Forest Plan, under Forest Wide Allocations, allows helicopter skiing. Wasatch Powderbird Guides (WPG) currently operates under a 5-year Outfitter and Guide Special Use Permit. The Revised Forest Plan continues to allow WPG to operate under the terms and conditions of their current 5-year SUP.

822. The Wasatch-Cache National Forest should prohibit/restrict heli-skiing for environmental reasons because it negatively impacts wildlife because it negatively impacts birds.
Response: Please refer to the September 1999 Final Environmental Impact Statement on Wasatch Powderbird Guides Permit Renewal for a thorough discussion of the effects of heli-skiing on wildlife. In this EIS a comprehensive mitigation plan was established with the advice and consent of the U.S. Fish and Wildlife Service (FWS). Due to WPG's season of operation, elevations at which they operate, the nature of the disturbance they generate, and the mitigation measures in place, their potential impact to wildlife is minimal.

823. The Wasatch-Cache National Forest should prohibit/restrict heli-skiing in certain areas.
823.1 In the canyon areas.
Response: The Wasatch-Cache National Forest provides a wide variety of recreational uses and opportunities to many user groups. The Forest Plan continues

to allow Wasatch Powerbird Guides to operate under the terms and conditions of their current 5-year Outfitter and Guide Special Use permit.

823.2 Along the entire Wasatch Range.
Response: The Wasatch-Cache National Forest provides a wide variety of recreational uses and opportunities to many user groups. WPG is one use and is currently allowed to operate under a 5-year SUP.

823.3 In the Tri-Canyon area.
Response: The Wasatch-Cache National Forest provides a wide variety of recreational uses and opportunities to many user groups. WPG is one use and is currently allowed to operate in the Tri-Canyon area under a 5- year SUP.

823.4 In Gobbler's Knob.
Response: The Wasatch-Cache National Forest provides a wide variety of recreational uses and opportunities to many user groups. WPG is one use and is currently allowed to operate in the Gobblers Knob area under a 5-year SUP.

823.5 In semi-primitive non-motorized areas.
Response: Alternatives 1 & 2 do this. In the Revised Forest Plan helicopter skiing will continue to operate as a component of the recreation picture in the Central Wasatch.

824. The Wasatch-Cache National Forest should prohibit. Wasatch Powderbird Guides heli-skiing use in the Tri-Canyon area.
Response: The Wasatch-Cache National Forest provides a wide variety of recreational uses and opportunities to many user groups. Wasatch-Powderbird Guides is one use and is currently allowed to operate in the Tri-Canyon area under a 5-year Outfitter and Guide Special User Permit.

Other

825. The Wasatch-Cache National Forest should prohibit scenic commercial aircraft overflights.
Response: Management of scenic overflights is under the juristiction of the Federal Aviation Administration, not the Forest Service.

Motorized Recreation - Watercraft

Allow Motorized Watercraft

826. The Wasatch-Cache National Forest should allow motorized watercraft by allowing personal watercraft.
Response: The Wasatch-Cache NF does allow boats with 5hp motors on lakes that are large enough not create user conflicts. Personal watercraft currently used on larger reservoirs would create unacceptable user conflicts on small National Forest lakes.

827. The Wasatch-Cache National Forest should open all lakes to boats with electric motors because there is no threat to the environment and this will permit the disabled to enjoy lakes.
Response: The Wasatch-Cache NF does allow boats with 5hp motors on lakes that are large enough not create user conflicts.

Do Not Allow/Restrict Motorized Watercraft

828. The Wasatch-Cache National Forest should not allow motorized watercraft.
Response: The Wasatch-Cache NF does allow boats with small motors on lakes that are large enough not create user conflicts.

Mechanized Recreation General

829. The Wasatch-Cache National Forest should manage mountain bikes as a distinct form of recreation, separate from motorized activities.
Response: The Wasatch-Cache National Forest manages mountain bike use appropriately through management prescriptions; travel management plans and current trail management guidelines.

830. The Wasatch-Cache National Forest should recognize the importance of singletrack trails to bicyclists.
Response: The Wasatch-Cache National Forest does recognize the importance of single-track trails to bicyclist. Not all trails are open to Mountain Bike use however.

831. The Wasatch-Cache National Forest should consider that designating the Mount Naomi roadless area as wilderness will lead to increased mechanized use and potential for conflict.
Response: The Mount Naomi roadless area is not being considered for proposed wilderness.

832. The Wasatch-Cache National Forest should require bikers and hikers to share restrictions.
Response: Because of safety, conflicts with other users and resources issues, mountain bike use requires a higher or more intense level of management and therefore requires more restrictions to manage use.

Allow Mechanized Recreation.

833. The Wasatch-Cache National Forest should allow mechanized activities.
833.1 On designated days and on trails that can sustain their travel
833.2 On roads and trails only.
833.3 Allow bikes off of designated trails.
Response: Mountain bike use will continue to be restricted to trails where it is allowed. Please refer the District Travel Management Plans for locations of trails open to mountain bike use.

834. The Wasatch-Cache National Forest should allow mechanized activities for environmental reasons.

834.1 Because mountain bikes do not impact the environment.

834.2 Because mountain bikes do not affect water quality.

Response: The Current Plan allows mountain bike on designated trails. We believe that mountain bikes can impact water quality indirectly.

835. The Wasatch-Cache National Forest should allow mechanized activities for social reasons because there is no information to support the claim that the presence of bicycles on shared-use trails increases the risk to other trail users' safety.

Response: The Forest Plan allows mountain biking to continue on designated trails. The Forest Service feels every user's safety is extremely important. If shared trail use creates an unacceptably dangerous situation then that shared use will have to be evaluated and mitigated.

836. The Wasatch-Cache National Forest should allow mechanized activities for economic reasons because mountain biking contributes to the local or regional tourism economy.

Response: The Forest Plan continues to allow mountain biking on designated trails across the forest. Please refer to District Travel Plans.

837. The Wasatch-Cache National Forest should allow mechanized activities in certain areas.

837.1 In wilderness areas

Response: The Wilderness Act prohibits mechanized activities in Designated Wilderness areas.

837.2 In limited areas

Response: The Forest allows mechanized use on designated roads and trails. Refer to District Travel plans and winter motorized use plans to find out where mechanized use is allowed.

838. The Wasatch-Cache National Forest should not restrict mountain biking because most users cause no damage.

Response: The Forest Plan continues to allow mountain biking on designated trails. Refer to District Travel Plans to find out information on where you can mountain bike.

Do Not Allow/Restrict Mechanized Recreation

839. The Wasatch-Cache National Forest should prohibit/restrict mechanized activities because it is dangerous to hikers and the environment.

Response: The Wasatch-Cache National Forest will continue to allow mechanized and non-mechanized activities in appropriate areas on the Forest.

Non-Motorized Recreation

Adequacy of Analysis

840. The Wasatch-Cache National Forest should consider the displacement effect of motorized recreation on non-motorized users.
Response: Motorized recreation use will continue to allow motorized activities on designated trails. However, the forest will continue to monitor recreational use and will re-examine the forest role as a provider of outdoor recreation and plan for ways to reduce recreational conflicts between users. The Revised Forest Plan identifies recreation use conflicts as a significant issue and will continue to identify areas for separation of non-motorized use consistent with growing demand.

Allow Non-Motorized Recreation.

841. The Wasatch-Cache National Forest should allow non-motorized activities.
841.1 By giving non-motorized users the highest priority.
841.2 By designating all remaining roadless areas for non-motorized use.
841.3 By designating areas as non-motorized which fulfill non-motorized recreation needs.
841.4 By setting aside more areas.
841.5 By designating/providing areas that meet a variety of non-motorized activities.
841.6 By resource allocation.
841.7 By allowing horses.
841.8 By improving trail signs, displays, restroom facilities, and educational programs for non-motorized recreationists.
Response: The Forest has evaluated a wide variety of alternatives when it comes to providing for non-motorized activities. Some of the alternative provide for increasing opportunities in non-motorized recreation, specifically alternatives 1 and 2. The Forest is continually improving trail signs, displays and restroom facilities. The Forest Service is continually improving educational curriculums it delivers through campfire talks, nature walks, avalanche and Ski with the Ranger programs.

842. The Wasatch-Cache National Forest should allow non-motorized activities for social reasons because it is good for health and social values. They should also provid more non-motorized recreation opportunities for the disabled.
Response: There are many areas the Forest that only allows non-motorized activity. The Forest is constantly improving existing campgrounds, picnic areas, recreation facilities and trails to better accommodate and serve persons with disabilities.

843. The Wasatch-Cache National Forest should allow only non-motorized activities in some areas by allowing off highway foot traffic only.
Response: The Wasatch-Cache NF management prescriptions provide for a broad range of recreational opportunities. Some areas allow motorized recreation, Some

areas do not allow any motorized activities such as in Wilderness. Refer to the Final Environmental Impact Statement for comparisons of alternatives by management prescription.

Do Not Allow/Restrict Non-Motorized Recreation

844. The Wasatch-Cache National Forest should prohibit/restrict non-motorized activities

844.1 By prohibiting any wheeled non-motorized device except bicycles where permitted and wheelchairs.

Response: The Wasatch-Cache NF management prescriptions provide for a broad range of recreational opportunities. Some areas allow motorized recreation, some areas do not allow any motorized activities such as in Wilderness. In some areas only hiking is allowed. Please refer to the Revised Forest Plan for descriptions of management prescriptions and management areas. Also, refer to the Final Environmental Impact Statement for comparisons of alternatives by management prescriptions.

844.2 By prohibiting horses.

Response: Horses are restricted in the Tri-Canyon and other specific areas for watershed protection and/or other reasons. Otherwise horse use is recognized as a legitimate recreational use and will continue to be allowed.

845. The Wasatch-Cache National Forest should prohibit/restrict non-motorized activities for environmental reasons.

845.1 To control environmental impacts

Response: The Forest Service is continually monitoring impacts to the Forest from all activities including non-motorized.

845.2 Because hikers disturb wildlife more than motorized users

Response: The Forest Service will continue to provide a broad range of recreational opportunities for all Forest users. There is no credible evidence that hikers disturb wildlife more than motorized use. However, there is a substantial body of scientific evidence that loud noises created by motorize vehicles like ATV's or four wheelers tend to disturb wildlife significantly more when compared to a person walking quietly in the woods.

Other

846. The Wasatch-Cache National Forest should develop standards and guidelines to manage rock climbing and extreme sports because of environmental impacts.

Response: Some standards and guidelines have been incorporated in the Forest Plan Direct for Climbing. The analysis of extreme sports and their routes are beyond the scope of the Forest Plan. Environmental impacts associated with those sports will be analyzed and managed on a site-specific basis.

847. The Wasatch-Cache National Forest should not let sport climbing routes be ruined.
Response: See response 846.

Ski Areas

Ski Areas General

848. The Wasatch-Cache National Forest should address ski areas in the document because this use is important in terms of user days and impacts.
Response: The Forest Plan and the Final EIS do address ski areas and their use. Please refer to Revised Forest Plan under Forest Wide Desired Future Conditions, Forest Wide Allocations and Management Area Descriptions for discussions of this issue.

849. The Wasatch-Cache National Forest should substantially strengthen the desired future conditions description for ski areas.
849.1 To minimize future development and impacts.
Response: The Revised Forest Plan and Final Environmental Impact Statement discuss this issue through a broad range of alternatives and the Ecosystem Management Framework and Forest Plan Model.

849.2 To avoid facility construction designed to divert customers from other resorts.
Response: This is beyond the scope and context of the Forest Plan. This issue will be discussed with site specific ski area proposals.

850. The Wasatch-Cache National Forest should develop a travel plan to bus people from the mouth of the canyon to ski areas.
Response: This is beyond the scope of the Forest Plan. The Utah Transit Authority already provides public bus service to the four ski resorts in Little Big and Little Cottonwood Canyons during the winter months.

851. The Wasatch-Cache National Forest should make guideline G73 a standard and enforce its direction that special uses "meet the tests of prudent, reasonable, and absolutely in the public interest." to prohibit uses that aren't in the best interest of the public.
Response: Guideline 73 has been removed. Please refer to G 80 & G 81 for guidelines for Special Uses.

852. The Wasatch-Cache National Forest should include clearly stated visual quality standards to avoid further deterioration.
Response: The Forest Service has adopted a new tool called the Scenery Management System for integrating the benefits, values, desires, and preferences regarding aesthetics and scenery for all levels of land management. Though many of the terms used in the previous Visual Management System have similar meaning

there are different key words being used. Visual quality of the Visual Management System is no longer used. The new terms used in understanding how the Forest is being managed are Landscape Character Themes, Landscape Character and Scenic Integrity Guidelines. See the Revised Forest Plan, Chapter 4, Section 3. Forestwide Standards and Guidelines, Scenic Resources for Forestwide Standards and Guidelines.

853. The Wasatch-Cache National Forest should consider that the 'high' Scenic Integrity Objective within the Resort Natural Setting is an oxymoron.
Response: Oxymoron is "a combination of contradictory or incongruous words" as stated in the Merriam-Webster Dictionary. Based on this definition you have stated you think or feel "high" Scenic Integrity is contradictory or incongruous with a Landscape Character Theme of Resort Natural Setting.

The basis for the use of Landscape Character Themes is to address existing or future land use, and the general image of the forest that is being managed. Resort Natural Setting Landscape Character theme for the purpose of the Revised Forest Plan is confined to the permit boundaries of the resorts. It recognizes that cultural modification to mountain is a function of activities and their supporting amenities.

Scenic Integrity provides a way to measure the degree to which a landscape is visually perceived to be complete. The highest scenic integrity rating was given to the landscape, which has little or no deviation from the described landscape character valued by constituents for its aesthetic appeal. See Revised Forest Plan, Chapter 4, Wasatch-Cache National Forest Landscape Character Theme and Scenic Integrity Guideline Definition Table. The landscape character of this culturally modified landscape is rating integrity of the modifications based on its harmony with the surrounding natural appearing landscape setting and provides baseline attributes to be able a meet a particular level of integrity.

If the ski resorts where being managed under another Landscape Character Theme and its accompanying landscape character description the Scenic Integrity could be lower or higher based on the amount of deviation from the described valued landscape character. Therefore the delineated areas on the Forest for each Landscape Character Theme must be judged against it own landscape character description for the degree of integrity that can be achieved.

854. The Wasatch-Cache National Forest should add a standard requiring ski areas to reseed cuts, runs, and other cleared areas.
Response: Current Forest Service and County "Best Management Practices" require ski areas to reseed cuts, runs and other cleared areas with native species.

855. The Wasatch-Cache National Forest should require ski area managers to work with their staff to change attitudes about wildlife and minimize direct wildlife impacts.

Response: Ski areas operating on the Wasatch-Cache National Forest work closely and carefully with Forest Service Wildlife Biologist and other staff persons to minimize potential effects to wildlife. Forest Service personnel accomplishe this through environmental reviews of all ski area proposals as well as yearly operating plans and through frequent monitoring activities.

856. The Wasatch-Cache National Forest should require all ski resorts operating under special use permits to hire an environmental administrator and have a peer review board in order to operate on public lands.
Response: Refer to response 855.

857. The Wasatch-Cache National Forest should request resorts close a half hour earlier each night where night skiing occurs for safety and to reduce light pollution.
Response: This issue is beyond the scope of the Forest Plan. Brighton is the only ski resort with a significant night skiing program on the Wasatch-Cache National Forest. The effects of night skiing lighting were carefully analyzed and thoroughly discussed in the 1999 Brighton Ski Resort Master Plan EIS.

858. The Wasatch-Cache National Forest should adjust ski area trail widths or create new trails to deal with the increase of traffic caused by higher speed and higher capacity lifts to keep a competitive edge.
Response: This issue is beyond the scope of the Forest Plan. This issue has been thoroughly analyzed and discussed in several recent EIS's completed for local Ski Resort Master Development plans.

859. The Wasatch-Cache National Forest should redraw the national forest boundary so that Snowbird ski and summer resort is under the jurisdiction of one national forest, not two. This would be less confusing and lead to less miscommunication.
Response: The Wasatch-Cache National Forest administers Snowbirds Special Use Permit, allowing them to operate on National Forest System lands. Snowbirds permit area boundary encompasses public and private land, crosses county and Forest boundaries and includes separate and distinct watersheds. Each County and Forest has jurisdictional responsibilities related to Snowbirds operations and each will continue exercise those responsibilities. Only Congress has the authority to change Forest Boundaries.

860. The Wasatch-Cache National Forest should address the degradation of watershed health due to ski resort expansion and operations. A description of the effects of ski resorts on aquatic resources should be included.
Response: The Forest Plan discusses watershed management within the framework of ecosystem management and sustainability. Please refer to the FEIS, Chapter 3, Topic 1 (Watershed Health) and Topic 2 (Aquatic Resources), Wasatch-Cache National Forest for a thorough discussion of this issue.

861. The Wasatch-Cache National Forest should disclose skier density so the public can make informed comment on the acceptability of the rapid increase in the amount of land allocated per skier.
Response: Skier densities are difficult to measure accurately and vary widely depending upon time of day, weekday or weekend and time of year, such as a holiday weekend, and vary widely from year to year. In addition, skier density can vary widely due to run difficulty, snow conditions, grooming conditions etc. Consequently, calculating accurate skier densities is extremely difficult and unreliable.

862. The Wasatch-Cache National Forest should estimate the number of skier days attributable to snowmaking to differentiate the portion of growth attributable to snowmaking because it has no bearing on whether there is demand for more terrain for skiing.
Response: The Wasatch-Cache National Forest did not calculate the number of skier days attributed to snowmaking since reliable data is unavailable. Skier visits at individual ski resorts vary annually due to differences in natural snow, marketing trends, or factors other than snowmaking. To distinguish between the numbers of skier days attributed to snowmaking would be questionable at best.

863. The Wasatch-Cache National Forest should assess the importance of non-motorized winter recreation areas and the yurt system.
Response: Non–motorized winter recreation is an important component of the total recreational use on the forest. Alternatives 1 & 2 of the Wasatch-Cache Final EIS discuss the importance of minimizing human interference and reducing motorized use. Alternative 7 in the Final EIS and The Revised Forest Plan create a non-motorized area in the Bunch Grass and Steam Mill peak area in the Logan Area Mountains.

Education.

864. The Wasatch-Cache National Forest should increase public education about the stewardship benefits of ski areas.
Response: The Forest Service and Wasatch-Cache ski areas in partnership have created Ski With the Ranger Programs and "Ski-Cology." Both of these programs educate forest users on the stewardship benefits of ski areas.

Skiing

865. The Wasatch-Cache National Forest should allow skiing.
865.1 By designating non-motorized winter recreation areas with enforceable boundaries or banning snowmobiles from the surrounding areas.
Response: All of the alternatives in the Wasatch-Cache Final EIS designate non-motorized areas with enforceable boundaries to varying degrees. In the Alternatives 1 & 2, non-motorize use is emphasized and snowmobiling is banned in most areas.

865.2 By including quality skiing experiences in the Desired Future Conditions
Response: Desired Future Condition is an integrated visualization of what the forest or management area should look like in the future. Skiing is a recreational activity, which people do on the forest. A quality skiing experience whether it occurs at a ski area or in a backcountry setting has always been an important component of the forests desired future condition for recreation management.

866. The Wasatch-Cache National Forest should encourage cross-country skiers to ski in wilderness areas.
Response: The Wasatch-Cache National Forest has always and will continue to encourage responsible recreational use that is allowed in Wilderness.

Ski Area Expansion

867. The Wasatch-Cache National Forest should address ski area expansion by defining year round resort development and requiring that each proposal be linked to a need that can only be met in an alpine setting.
Response: This is beyond the scope of the Forest Plan. Any ski area expansion proposal is thoroughly analyzed through the development of ski area master plans an accompanying NEPA review. A needs analysis is a required component of any NEPA document.

867.1 By establishing a reasonable process other than a Forest Plan amendment for potential adjustment or expansion of resort permit boundaries during the life of this plan.
Response: The Revised Forest Plan states: "New resort developments on National Forest System land will be confined to the permit area boundaries in effect at the time of revision, though small-scale site-specific adjustment could be considered to address important management issues." The process for forest plan amendments can be found in Chapter 5 of the Revised Forest Plan.

867.2 By clarifying that language on page 4-99 of the Forest Plan does not prohibit the Forest Service from considering proposals for boundary expansion.
Response: The Revised Forest Plan on page 4-99 reads, "New resort developments on National Forest System lands will be confined to the permit area boundaries in effect at the time of revision, though small scale site specific adjustments could be considered to address important management issues." The process for forest plan amendments can be found in Chapter 5 of the Revised Forest Plan.

867.3 By recognizing that the issue of ski area expansion onto private lands is still under consideration.
Response: The Forest Service has no jurisdiction over private lands. State, Counties and Municipalities typically have various types of jurisdictional authority over private land. Refer to response above.

867.4 By suggesting that the ski areas apply better resource management while they are open rather than expand.
Response: Ski areas operate on public land under a Special Use Permit administered by the Forest Service. The Forest Services manages the terms and conditions of the SUP, not the day-to-day operation of the resort.

868. The Wasatch-Cache National Forest should change language in the Forest Plan.
868.1 On page 4-99 regarding ski resort developments.
Response: The Statement in the Revised Forest Plan reads, "New Resort Developments on National Forest System Lands will be confined to permit boundaries in effect at the time of revision…."

868.2 On page 4-99 regarding opportunities that build on public land values.
Response: We have chosen not to change the language in the Revised Forest Plan.

868.3 On pages 53 and 54 because the language pertaining to ski area development is too permissive.
Response: We were unable to find sentence the statement that was being referred to on pages 53 and 54.

869. The Wasatch-Cache National Forest should explain in the Forest Plan that regular maintenance or replacement of existing resort equipment and/or facilities are categorically excluded from the National Environmental Policy Act analysis.
Response: A Forest Plan provides broad program level direction for management of the land and its resources. A Forest plan does not contain commitments to implement specific projects. All proposed projects involve some level of environmental analysis and public involvement and that is where these decisions will be made.

870. The Wasatch-Cache National Forest should write a directive into the Tri-Canyon Crisis Plan regarding approval for modifications of existing developments.
Response: All major or significant modifications of existing developments on private or public land in the Tri-Canyons require various approvals either from the State of Utah, Salt Lake County, Salt Lake City and/or the Forest Service and sometimes all four.

871. The Wasatch-Cache National Forest should address the concern over the total number of gallons of petroleum fuel planned to be stored within the Hidden Peak expansion.
Response: This is beyond the scope of the Forest Plan. This issue was thoroughly analyzed in the recent Snowbird Master Development Plan and accompanying Environmental Impact Statement.

Allow Ski Area Expansion

872. The Wasatch-Cache National Forest should not place restrictions on the ski industry based on the speculative possibility that the, or other species, will be placed on the endangered species list because a flexible policy will allow the Forest Service to react as science develops rather than make premature restrictions.
Response: The Endangered Species Act directs all government agencies to protect species listed as threatened and endangered. This includes habitat. Eleven counties in Northern Utah are included as lynx habitat by the US Fish and Wildlife Service (FWS). Salt Lake County is one of those counties. The Forest will work closely with the FWS on all mitigation requirements they outlined for this species. The Forest Plan provides broad program-level direction for management of the land and its resources. Future projects carry out the direction in the Forest Plan. Ski areas fall into a subset of recreation goals and objectives affecting Forest lands. Within the framework of the Forest Plans effort for ecosystem management, these topics are adequately addressed.

873. The Wasatch-Cache National Forest should expand the new swing because it is the only environmentally safe way to drop users off without damaging the ecosystem.
Response: The question cannot be answered as it is worded.

874. The Wasatch-Cache National Forest should eliminate the visual integrity of ridgelines requirement for Mount Ogden to allow gondola construction.
Response: This is a Recreation Desired Future Condition for the Snowbasin Ski Area and the integrity of the ridgeline would be evaluated on a case-by-case basis and is beyond the scope of this analysis.

Do Not Allow/Restrict Ski Area Expansion.

875. The Wasatch-Cache National Forest should prohibit/restrict ski area expansion and infrastructure development.
875.1 Do not expand beyond the year 2000 boundaries
875.2 Do not allow activities resembling expansion beyond current boundaries.
875.3 Do not use public land to subsidize real estate development.
875.4 Do not justify expansion by claiming to protect backcountry travelers from dangers such as avalanches.
875.5 Prohibit infrastructure development.
875.6 Because the industry has not experienced significant growth.
875.7 Because of increased dispersed recreation.
875.8 Because it is taking away non-motorized areas.
Response: The expansion issue is addressed in the Revised Forest Plan and through the broad range of alternatives displayed in the Final Environmental Impact Statement. The Forest Plan in Chapter 4 under the Central Wasatch Management

area states: New resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision, though small-scale site-specific adjustments could be considered to address important management issues. Any proposed ski resort expansion and infrastructure development is studied and approved through a site specific Resort Development Master Plan. This includes a thorough NEPA review.

876. The Wasatch-Cache National Forest should prohibit/restrict ski area expansion and infrastructure development for environmental reasons.
876.1 Because of cumulative impacts.
876.2 Because of the artificial and substantial increases of human impacts.
876.3 To protect watersheds.
876.4 To protect wildlife.
876.5 To protect nesting birds.
876.6 Because of night sky pollution.
876.7 Because it affects aesthetic qualities.
876.8 Have clear language in the Forest Plan setting standards for forest preservation.
876.9 Until provisions are met for monitoring, enforcement, clean up, and maintenance.
Response: The expansion issue is addressed in the Revised Forest Plan and through the broad range of alternatives displayed in the Final Environmental Impact Statement. The Forest Plan in Chapter 4 under the Central Wasatch Management area states, "New resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision, though small-scale site-specific adjustments could be considered to address important management issues." Any proposed ski resort expansion and infrastructure development is studied and approved through a site specific Resort Development Master Plan. This includes a thorough NEPA review.

877. The Wasatch-Cache National Forest should prohibit/restrict ski area expansion and infrastructure development for social reasons
877.1 Because it does not benefit everyone.
Response: Alternatives 1 & 2 do this.

877.2 Because crowding and safety issues do not justify expansion
Response: The expansions issue is addressed in the Revised Forest Plan and through the broad range of alternatives displayed in the Environmental Impact Statement. The Forest Plan in Chapter 4 under the Central Wasatch Management area states, "New resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision, though small-scale site-specific adjustments could be considered to address important management issues." Alternative 7 in the Final EIS covers this issue. Any proposed ski resort expansion and infrastructure development is studied and approved through site specific Resort Development Master Plans and accompanying NEPA review.

878. The Wasatch-Cache National Forest should prohibit/restrict ski area expansion and infrastructure development in certain areas and specific resorts.
Response: The expansions issue is addressed in the Revised Forest Plan and through the broad range of alternatives displayed in the Environmental Impact Statement. The Forest Plan in Chapter 4 under the Central Wasatch Management area states, "New resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision, though small-scale site-specific adjustments could be considered to address important management issues." Alternative 7 in the Final EIS covers this issue. Any proposed ski resort expansion and infrastructure development is studied and approved through site specific Resort Development Master Plans and accompanying NEPA review.

879. The Wasatch-Cache National Forest should prohibit avalanche control outside of ski resort boundaries and traffic corridors.
Response: This issue was analyzed in the final Environmental Impact Statement Wasatch Powderbird Guide (WPG) permit renewal. WPG is allowed to use explosives for snow stability evaluation as part of the safe operation of their business. This use is authorized under the terms of their Special Use Permit.

880. The Wasatch-Cache National Forest should develop a standard that prohibits ski and snowboard area expansions and prohibits development of new ski/snowboarding areas on a forest-wide basis.
Response: See Response to question 878

881. The Wasatch-Cache National Forest should prohibit resort building on prominent ridges because it alters the viewshed
Response: Any proposed ski resort expansion and infrastructure development is studied and approved through site specific Resort Development Master Plans and accompanying Environmental Impact Statements. This issue is addressed in the Forest Plan and through the broad range of alternatives displayed in the Final Environmental Impact Statement.

882. The Wasatch-Cache National Forest should not allow ski resorts to turn into all season recreation areas or destination resorts because of impacts to wildlife.
Response: See response 876.

883. The Wasatch-Cache National Forest should prohibit the development of trams or lifts in roadless areas.
Response: The Forest Plan does this.

884. The Forest Plan should state that lift-served expansion at Snowbasin will be discouraged outside current boundaries.
Response: The expansion issue is also addressed in the Forest plan and through the broad range of alternatives displayed in the Environmental Impact Statement. The Forest Plan in Chapter 4 under the Central Wasatch Management area states, "New

resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision, though small-scale site-specific adjustments could be considered to address important management issues." Alternative 7 in the Wasatch-Cache Final EIS covers this issue. Any proposed ski resort expansion and infrastructure development is studied and approved through site specific Resort Development Master Plans and accompanying NEPA review.

Ski Area Interconnects

885. The Wasatch-Cache National Forest should allow ski area interconnects.
Response: The Forest Plan provides broad program-level direction for management of the land and its resources. The forest plan, in chapter four in the Central Wasatch Management Area talks about new resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision. Any proposed resort expansion and infrastructure development within the existing resort boundaries or ski area interconnects will be studied through site specific Resort Development Master Plans and accompanying NEPA Review.

886. The Wasatch-Cache National Forest should keep open the possibility of allowing future construction of a gondola connecting Ogden City with Snowbasin Resort.
Response: Any proposed ski resort expansion and infrastructure development is studied and approved through site specific Resort Development Master Plans and accompanying Environmental Impact Statements.

887. The Wasatch-Cache National Forest should prohibit interconnection of ski areas because they are not needed.
Response: The Forest Plan provides broad program-level direction for management of the land and its resources. The Forest Plan, in Chapter 4 in the Central Wasatch Management Area, states that new resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision. Any proposed resort expansion and infrastructure development within the existing resort boundaries and ski area interconnection will be studied through site specific Resort Development Master Plans and accompanying NEPA Review.

888. The Wasatch-Cache National Forest should clarify that the prohibition of ski area expansion includes ski area interconnects.
Response: The Forest Plan provides broad program-level direction for management of the land and its resources. The forest plan, in chapter four in the Central Wasatch Management Area talks about how new resort developments on National Forest System lands will be confined to the permit boundaries in effect at the time of revision. Any proposed resort expansion or infrastructure development within the existing resort boundaries and ski area interconnections will be studied

through site specific Resort Development Master Plans and accompanying NEPA Review.

Hunting and Fishing

889. The Wasatch-Cache National Forest should prohibit hunting.
889.1 In the Wasatch Range
889.2 In the Cottonwood Canyons
Response: See response 65.

Outfitter-Guides/Special Use Permits

890. The Wasatch-Cache National Forest should allow guided access.
Response: The need for guided access will be determined by the criteria noted in Chapter 5 of the Revised Forest Plan and in conjunction with the Revised Forest Plan Goals and Sub-goals and Standards and Guidelines.

890.1 Because this will bring more funding for motorized trail upkeep
Response: See response 890.

890.2 For safety reasons
Response: See response 890.

891. The Wasatch-Cache National Forest should retain designations for special use permit holders.
Response: The Forest will continue with current special uses as identified in Revised Forest Plan Chapter 4, A.4. Forestwide Standards and Guidelines.

892. The Wasatch-Cache National Forest should make it easy to obtain guiding licenses.
Response: See response 890.

893. The Wasatch-Cache National Forest should consider a permit system for wilderness areas when other plans to reduce use are not successful.
Response: Thank you for your comment. A permit system could be one of the management options for reducing use in the Wilderness.

894. The Wasatch-Cache National Forest should document the public demand for outfitters/guides.
Response: See Revised Forest Plan, Chapter 5, and Monitoring.

Camping

Camping General

895. The Wasatch-Cache National Forest should consider that the Preferred Alternative best meets the recreation demand b ecause it allows additional facility development in the more developed Recreation Opportunity Spectrum classes, but emphasizes replacement of current facilities and site hardening.
Response: Thank your for your comment.

896. The Wasatch-Cache National Forest should determine which recreation sites need to be hardened to protect the environment and natural landscape.
Response: Considering site hardening at recreation sites would be completed at the project level and is beyond the scope of the Revised Forest Plan analysis.

897. The Wasatch-Cache National Forest should not harden campsites.
Response: See response 896.

898. The Wasatch-Cache National Forest should remove and relocated campgrounds in riparian zones and flood plains to upland sites so that riparian areas can be reclaimed.
Response: Removing and relocating campgrounds would be a project level decision, which is beyond the scope of the Forest Plan. At the program level however, direction is giving in the Revised Forest Plan, MPC 3.1-Aquatic Habitat (3.1A) /Watershed (3.1W) where emphasis is on maintaining or improving quality of watershed conditions and aquatic habitats. This would be a consideration when projects are proposed and one option that could be considered is removal and relocation of a campground.

899. The Wasatch-Cache National Forest should continue using concessionaires to encourage small businesses.
Response: Thank you for your comment the WCNF will continue to concessionaires to help in the management of their recreation facilities.

900. The Wasatch-Cache National Forest should address its management of camping areas in Logan Canyon because current management is driving people away.
Response: This is to specific and beyond the scope of the Forest Plan, but we will pass this information on to the managing unit.

901. The Wasatch-Cache National Forest should allow only minor further development of existing campgrounds and picnic sites in Logan Canyon.
Response: See response 900.

Allow Camping

902. The Wasatch-Cache National Forest should provide more areas for camping.
Response: New developed recreation facilities are proposed in all alternatives except Alternative 1. See Chapter 2 of the FEIS.

902.1 By keeping campgrounds open
Response: See response 900.

902.2 By providing all season camping areas in Little Cottonwood Canyon
Response: See response 900.

902.3 By extending the camping area in Tony Grove
Response: See response to concern statement 900.

902.4 By allowing natural unplanned campgrounds
Response: As per the Revised Forest Plan in Recreation goals and objectives the WCNF will inventory and develop concentrated use area plans for recreation where site amenities will focus on protection of the Forest resources. This will meet your definition of unplanned campgrounds.

902.5 By allowing larger campsites to accommodate larger camping vehicles
Response: See response 900.

902.6 By creating a horse camp in Franklin Basin
Response: See response 900.

903. The Wasatch-Cache National Forest should maintain present camping opportunities and winter and summer recreational activities.
Response: Alternative 7 for recreation is very close to the existing condition for winter and summer recreational opportunities.

Do Not Allow/Restrict Camping

904. The Wasatch-Cache National Forest should prohibit large organizational camping groups in the Prove River drainage and Hayden Fork.
Response: See response 900.

905. The Wasatch-Cache National Forest should control scout troops.
Response: See response 900.

906. The Wasatch-Cache National Forest should confiscate unattended property for those who disregard the fourteen-day camping restriction.
Response: See response 900.

Dogs

Dogs General

907. The Wasatch-Cache National Forest should address management of dogs and the health of the forest

Response: The issue of managing dogs on the Forest is indeed not addressed in the Revised Forest Plan. This issue is an important one at this time primarily in the Central Wasatch Management Area (Tri-Canyon) watersheds and is being addressed jointly by the Salt Lake County and the Salt Lake Ranger District. It was too site-specific to be adequately addressed in the broad environmental analysis for Forest Plan Revision.

Allow Dogs

908. The Wasatch-Cache National Forest should allow dogs.

908.1 Allow dogs in all canyons
908.2 Allow dogs in Millcreek Canyon
908.3 Implement a permit system to allow dogs in watershed areas
908.4 Provide for dispersed dog-friendly recreation opportunities
908.5 Set land aside for off-leash dog areas or conduct studies and open all canyons to dogs

Response: See response 907.

Do Not Allow/Restrict Dogs

909. The Wasatch-Cache National Forest should prohibit/restrict dog visits.

Ban dogs in Mill Creek Canyon
Incorporate regulations for dogs

Response: See response 907.

Miscellaneous Activities

910. The Wasatch-Cache National Forest should prohibit concerts and resort-sponsored activities because of light and noise pollution.

Response: Activities within ski area boundaries are regulated through the Special Use Permit and Operating Plans rather than in the broad forestwide direction of the Revised Forest Plan. Activities adjacent to ski area permit boundaries will be subject to the management prescriptions mapped there in the Revised Forest Plan. These prescriptions include standards and guidelines that spell out the types of activities that are allowed or not allowed there including new trail construction. Outfitter guide services are regulated by the specific Special Use Permit issued for that service and are not addressed by the broad direction of the Revised Forest Plan.

911. The Wasatch-Cache National Forest should manage the people who use the national forests to party because they disrupt other people.
Response: Management Direction included in the Revised Forest Plan does include recreation opportunity class maps that show where one should expect to find different degrees of solitude and facility development. In those areas where the user densities are expected to be relatively high, interactions between visitors are to be expected. The Revised Plan also includes an Objective to increase the amount of education and enforcement in order to reduce conflicts between forest users. User ethics is an area of focus for the education and enforcement that we expect to emphasize over the life of the Plan.

Scenery

912. The Wasatch-Cache National Forest should elevate Guideline 52 on page 4-30 to a standard and modify the wording to maintain scenic integrity.
Response: The goal states: "Resource management activities should not be permitted to reduce Scenic Integrity below Objectives stated for Management Prescription Categories." Because the Scenic Integrity Objectives (SIOs) are desired future condition for Forest landscapes a site-specific analysis will need to take place to determine the ability of the landscape to maintain the SIO. Being able to provide to the public rational for such a deviation would be more in line with a desire future condition than to have a binding limitation that would require a Forest Plan amendment.

Topic 5: Roadless Areas/Wilderness Management

Roadless Areas/Wilderness Management General

Management General

913. The Wasatch-Cache National Forest should protect public lands as wilderness and roadless areas.
913.1 Because they provide a high quality of life
913.2 Because they provide high quality hunting experiences
Response: We agree. Certain public lands that meet the criteria for Wilderness can provide a variety of ecosystem benefits and unique recreation opportunities for the public. The forest plan alternatives analyze several possibilities.

914. The Wasatch-Cache National Forest should adopt suggestions made by the High Uintas Preservation Council regarding wilderness and roadless area management.
Response: The recommendations made by this organization have been considered and are included in the range of alternatives for possible wilderness recommendations and oil and gas leasing.

915. The Wasatch-Cache National Forest should focus development in areas that are already developed.

Response: Already developed areas are allocated to management prescriptions that allow further development or redevelopment. In undeveloped areas (roadless areas) a range of management prescriptions has been applied across the range of alternatives that allow for development, mostly maintain roadless values, or fully maintain them.

Roadless Area/Wilderness Boundaries

916. The Wasatch-Cache National Forest should adjust the boundaries of roadless and wilderness areas in order to provide necessary protection.

916.1 Burch Creek Roadless Area

Response: The comments received are very detailed and site-specific proposing minor adjustments to roadless area boundaries or recommendations to improve manageability for recommended Wilderness. These comments are valuable, and can be used to make minor adjustments when, and if a decision to protect the roadless or wilderness character is made. Until that time, the comment has generally been considered as within the range of alternatives for the allocation of management prescriptions and other management direction for the area.

916.2 High Uintas

Response: We recognize your position that much of the area should be recommended as Wilderness, and your comment is considered within our range of alternatives. These are also very detailed and site-specific, proposing minor adjustments to roadless area boundaries or recommendations to improve manageability for recommended Wilderness. These comments are valuable, and can be used to make minor adjustments when, and if a decision to protect the roadless or wilderness character is made. Until that time, the comment has generally been considered as within the range of alternatives for the allocation of management prescriptions and other management direction for the area.

916.3 Lakes Area

Response: See response 916.2

916.4 Lone Peak additions

Response: See response 916.1

916.5 Mount Aired

Response: See response 916.2

916.6 Mount Naomi

Response: See response 916.2

916.7 Mount Olympus

Response: See response 916.1

916.8 Stansbury Management Area
Response: See response 916.2

916.9 Upper South Fork Roadless Area
Response: See response 916.2

916.10 White Pine
Response: See response 916.2

Roadless Area Management

Roadless Area Management General

917. The Wasatch-Cache National Forest should consider local input when deciding how to manage roadless areas.
Response: The range of alternatives and Appendices C1 and C2 speak directly to the individual values of roadless areas and their potential for wilderness recommendation. We believe our range of alternatives and site specific considerations of values are responsive to local opinions on how to manage these areas. Local input on their management was considered in the planning process through public meetings and written and oral input.

918. The Wasatch-Cache National Forest should add a project level consideration of roadless areas.
Response: The values of roadless areas are considered by project level proposals. While these are not forest plan decisions, interim direction to protect roadless area values is in place for project level decisions and is also provided in established Forest Service direction on environmental policy and procedures (FSH 1909.15).

919. The Wasatch-Cache National Forest should protect roadless areas to preserve environmental values.
Response: We recognize the values of roadless areas both on the Wasatch-Cache and elsewhere. Appendix C-2 identifies many of the roadless values present on the Wasatch-Cache. The range of alternatives provide for a variety of management schemes ranging fro largely maintaining these values or to allowing considerable use and development of roadless areas.

920. The Wasatch-Cache National Forest should maintain roadless area characteristics of all inventoried roadless areas.
920.1 By keeping existing roadless areas roadless
920.2 By prohibiting all development and motorized recreation
Response: See response 919.

921. The desired future condition descriptions for Burch Creek and Taylor Canyon should specify that special use proposals will not impact roadless characteristics of these areas.

Response: We recognize your interest in this area and a range of alternatives from recommended Wilderness and roadless protection to management that would allow considerable development is laid out for these two areas in the FEIS and accompanying maps.

922. The Wasatch-Cache National Forest should not manage roadless areas as non-motorized.

Response: In some alternatives that recommend a lot of wilderness most of the roadless areas on the Wasatch-Cache are managed for non-motorized use. In most alternatives considerably more of roadless areas is available for either summer or winter motorized use. Readers should be reminded that inventoried roadless areas are not necessarily non-motorized. The roadless character of an area does not prescribe non-motorized trail use. The motorized or non-motorized use of trails is a travel management decision, is not dependent on roadless character, and is generally outside the scope of the decisions being made in this forest plan revision. Winter motorized and non-motorized uses for areas of the forest are decided by the forest plan revision and are shown on the Winter Recreation maps.

923. The Wasatch-Cache National Forest should avoid managing all roadless areas the same.

Response: Considerable variety in the management of roadless areas is presented across the range of alternatives in the FEIS. While Alternatives 1, 2, and 6 applied the national roadless rule at the time of their formulation, and still maintain many blanket protections for roadless character, the other alternatives provide a different set of potential management and uses for roadless areas. In the FEIS, Appendices C1 and C2 discuss the potential wilderness and roadless values of roadless areas, while the Topic 5 in Chapter 3 looks at alternatives for managing these areas.

924. The Wasatch-Cache National Forest should eliminate human use of roadless areas under any prescription other than wilderness.

Response: In the FEIS Alternative 1 essentially falls in this category of management. Other alternatives allows different ranges of maintenance of roadless area values or potential human uses of roadless areas. Forest management and the planning team tried to examine a broad range of alternatives for roadless area management.

Adequacy of Analysis

925. Public Concern: The Final EIS should clarify exactly how many acres of roadless lands exist on the forest and correct discrepancies in the document text.

Response: The Topic 5 in Chapter 3 of the FEIS and Appendices C1 and C2 show Wasatch-Cache inventoried roadless areas, their values as wilderness or other roadless values and their acreages. Topic 5 in the FEIS and Table C1-1 and related text in Appendix C talk to changes in these roadless areas over time provide some caveats regarding the accuracy of inventory acreages.

926. The Wasatch-Cache National Forest should state in the Forest Plan that because the plan does not analyze environmental effects of activities in roadless areas, an additional EIS will be required for significant federal actions affecting roadless areas.

Response: Procedural requirements for project environmental analyses are covered in departmental regulations and agency policy, and need not be repeated in these documents. It is true, however, that project proposals in inventoried roadless areas carry with them additional considerations for analysis and disclosures of effects.

927. The Wasatch-Cache National Forest should remove reference to inventoried roadless areas from tables in the Draft EIS.

Response: A range of considerations for how to treat roadless areas was considered across alternatives. In some alternatives no distinctions between allowed activities within roadless areas and outside them was considered. In other alternatives there were differences between activities allowed inside or outside roadless areas. We think this presented both a reasonable and legal range of alternatives.

Roadless Area Designation General

928. The Wasatch-Cache National Forest should ground proof the linear route off of Red Butte Road before including this area in the roadless inventory.

Response: This was done since the publication of the DEIS. The Red Butte Road is a cherry-stem into the roadless area to a point where the road is no longer maintained or passable by a passenger car. At this point the original "road" is more trail-like in its character and not considered a road from a roadless inventory perspective as it proceeds further into the area. The Red Butte RNA is closed to the general public and not available for recreation.

Roadless Area Criteria

929. The Wasatch-Cache National Forest should protect roadless areas that are adjacent to wilderness areas.

Response: Prescriptions for recommended wilderness, maintenance of roadless values or development were applied to roadless areas adjacent to designated Wilderness across the alternatives to provide a range of considerations regarding potential effects. See the management prescription, ROS, and winter recreation maps for the alternatives.

930. The Wasatch-Cache National Forest should not define areas with roads as roadless.

Response: The procedures for mapping roadless areas and definitions for what constitutes a road are laid out by the Intermountain Region protocol, Roadless Inventory and Evaluation Guide (1998), for doing this work. That protocol was made available to and reviewed for the public during the roadless inventory public open houses in the Fall of 1998. While opinions and definitions related to this work

still differ, the definitions, and procedures for our inventory were disclosed publicly and are on file.

931. Public Concern:The Wasatch-Cache National Forest should fully evaluate roadless areas using additional criteria as established in 219.17
Response: Considerable effort was spent between the publication of the DEIS and the FEIS on doing more analysis of roadless area values. The criteria for the evaluations done in Appendices C1 and C2 of the FEIS are shown there. These criteria cover what is legally required in the forest planning process in 36 CFR 219.17 and go further than that by considering additional criteria also.

Do Designate Roadless Areas

932. The Wasatch-Cache National Forest should designate certain areas roadless.
932.1 Mineral Fork
932.2 Mueller Park and Red Butte Canyon
932.3 Swan Peak
Response: These four areas are included in the roadless inventory. Mueller Park and Red Butte were added as roadless areas between the Draft and Final EISs as a result of public comments. The values of these areas for wilderness recommendation and as roadless areas are considered in Appendices C1 and C2 to the FEIS. A range of management types for these areas is also presented in the FEIS.

933. The Wasatch-Cache National Forest should designate the watershed areas as roadless in the Wheeler Creek Drainage.
Response: A range of management prescriptions for the Wheeler Creek Drainage are considered in the FEIS, and these can be seen in the maps of those prescriptions and interpreted using management prescription definitions found in Chapter 4 of the revised Forest Plan. Watershed values among with many other values were considered in evaluating roadless areas. The undeveloped area on the Wasatch-Cache including Wheeler Creek did not meet the minimum 5,000 acre size to qualify as a roadless area defined by FS Handbook 1909.12. and the draft Intermountain Region protocol on Roadless Inventory and Evaluation Guide (1998).

Do Not Designate Roadless Areas

934. The Wasatch-Cache National Forest should not designate any more land as roadless or wilderness.
Response: Roadless areas are not “designated”. While this response may seem bureaucratic, trifling and based on semantics, the words used are important to us. Roadless areas are identified by the Forest Service though a required inventory process that is based on published criteria. After its inventory, the Forest Service is required by the planning regulations (36 CFR 219) to consider recommendations of

appropriate roadless areas to the National Wilderness Preservation System. These recommendations eventually go to Congress for its consideration.

Wilderness areas are "designated". This is done when Congress passes Wilderness acts. Congress reviews the recommendations from the Forest Service, and if it senses public opinion, resource, political, and social needs support a choice for designation it can deliver these laws and formally "designate" more Wilderness.

Alternatives 4 and 5 in the FEIS provide for no more Wilderness, and only limited protection for roadless area values. See the Topic 5 discussion in Chapter 3 of the FEIS.

Other Designations

935. The Wasatch-Cache National Forest should develop a Back Country Recreation Area designation for roadless areas.
Response: See response 98.

Additionally, your comment has many good suggestions discussing what Congress might do and what the BLM has provided for as administrative solutions for dealing with roadless area values and user demands for these areas. We also looked into the administrative designation of "Primitive Area" which was formerly applied to many undeveloped national forest system areas prior to their designation as Wilderness. This is apparently not a good solution for us at the moment. Finally, we think that the range of alternatives provided in this analysis gives our decision makers a number of differing management scenarios for roadless areas and information on the effects associated with those choices.

Wilderness Management

Wilderness Management General

936. The Wasatch-Cache National Forest should clarify how wilderness areas will be managed.
Response: Between the Draft and Final EISs Appendix VI was expanded to include standards and guidelines all Wilderness areas on the Wasatch-Cache. Similarly, the Desired Future Conditions statements for Wildernesses along the Wasatch Front were expanded considerably to clarify public and agency expectations for their future management.

937. The Wasatch-Cache National Forest should manage wilderness areas for non-degradation.
Response: This concept is a fundamental premise for managing Wilderness which goes back to the Wilderness Act (1964) and is carried forward in the revised Forest Plan through the forestwide DFC for Designated Wilderness and Standards and Guidelines, as well as management area DFCs that address Wildernesses and

individual Wilderness goals, standards and guidelines. Additional direction available outside this forest plan on managing Wilderness for non-degradation is identified at the beginning of the section on forestwide Wilderness standards and guidelines in Chapter 4. A. 3. of the revised Forest Plan.

938. The Wasatch-Cache National Forest should manage lands as wilderness during the current Administration.

Response: The range of alternatives provided in the FEIS provides choices with projected effects for managing the roadless areas on the Wasatch-Cache. Our decision makers will review and document their decisions carefully for the long term good of these lands and to serve the needs of the American people.

939. The Wasatch-Cache National Forest should prepare wilderness management plans in a timely manner.

939.1 For the Tri-Canyon wilderness

939.2 For the Uinta Wilderness

939.3 For the Mount Naomi Wilderness

Response: In the proposed Forest Plan that was produced with the release of the DEIS in May 2001 a schedule of wilderness management planning was identified as an objective. This objective is not present in the revised Forest Plan that is being released now. Forest leadership looked at the list of potential Forest Plan related objectives, and then prioritized that work and developed the current objectives (See Chapter 4.A.3.) While active management of Wilderness is a high priority for our work, no specific commitment to Wilderness planning is now made. If future funding or reprioritization of work and management emphasis on Wilderness planning surfaces, this is indeed a possibility.

Recognizing this change from the DEIS and proposed Forest Plan of 2001, the revised Forest Plan provides additional management direction for the six Wildernesses along the Wasatch Front in Appendix VI to help meet the need for management direction for these Wildernesses. Additional detail in Desired Future Conditions statements for these Wildernesses was also completed to give managers and the public ideas for their management.

940. The Wasatch-Cache National Forest should restrict access to wilderness areas by implementing a permit system.

Response: The comment suggests a permit system for heavily used areas of the High Uintas Wilderness, citing the Kings Peak area on holidays as overly used. While we know that these situations occur, particularly in some areas, this forest planning process did not analyze this question, and it was not raised as a driving issue during revision. Standards and guidelines for the High Uintas, as well as for the other Wildernesses on the Wasatch-Cache (See Chapter 4 and Appendix VI), provide direction that could be used limit or redistribute use for resource protection and recreational solitude.

941. The Wasatch-Cache National Forest should use language in the Wilderness Act, which calls for no motorized vehicles, to guide wilderness management.
Response: Motorized uses are not allowed in designated Wilderness, as required by the Wilderness Act and any subsequent regulations or policy. Our management prescriptions also prescribe that using motor vehicles or other motorized equipment is not allowed as stated in the 1964 Wilderness Act.

942. The Wasatch-Cache National Forest should clarify that wilderness means non-management.
Response: The fact that management in Wilderness is non-traditional, that is, it is done with a minimum tool philosophy and without motorized equipment and other conveniences normally available out side the Wilderness, does not mean that Wilderness is not managed. Contrarily, substantial attention and funding are spent on managing Wilderness so that it can meet the intent of Congress, the administration and the American people. Development does not necessarily mean management.

Adequacy of Analysis

943. The Wasatch-Cache National Forest should require that any land recommended for wilderness pass a manageability and suitability test.
Response: Part of the evaluation done for each roadless area in Appendix C-1 of the FEIS is an evaluation of these characteristics. The FS Handbook on Wilderness Evaluation (1909.12, Chapter 7) discusses these attributes under section 7.21 Capability regarding “suitability” and section 7.22 Availability regarding “manageability” and our appendix includes these considerations. “Need” is another criterion that is identified in that FS Handbook chapter and it is also evaluated for each roadless area.

944. The Wasatch-Cache National Forest should provide data to justify its claim that snowmobiling on the outer 42 percent of the Lakes Roadless Area precludes its designation as wilderness.
Response: We determined that the outer portion of the Lakes roadless area, (approximately 42% of it) was more used and more popular for snowmobiling than the remaining inner core of the area. We made this determination by interacting with members of the snowmobiling community and developing a map of snowmobile use there based on these interactions. The resulting map was reviewed and adjusted by Forest and Ranger District specialists and converted into a GIS layer to develop the information.

The fact that the outer portion of the Lakes area is used by snowmobiles does not preclude it from recommendation as Wilderness. This was one factor among many in the consideration of the area and in the development of the alternatives that are presented in the FEIS.

945. The Wasatch-Cache National Forest should correct inaccuracies in the Forest Plan regarding inventoried roadless areas.

Response: The Mt. Logan Roadless area identified in the roadless inventory done in 1983 was split into three different roadless areas for the 1999 roadless inventory: Mt Logan North, South and West roadless areas. Mapping criteria changed between the 1983 and 1999 inventories so that the Providence and Millville Canyon roads are now considered roads and dividers between the areas. During the last decade or more, the condition of these roads has actually deteriorated, although use of the roads may have increased due to improved and more abundant 4WD and ATV vehicles and users.

Wilderness Designation General

946. The Wasatch-Cache National Forest should consider public demand for wilderness areas.

Response: The forest is sensitive to public opinions regarding demand for and opinions against recommending more Wilderness, but the determination and decision to recommend is not based on a poll, referendum, or other counting of public opinion on the matter. Lands must first be evaluated using the criteria outlined in Appendix C-1 to the FEIS and have substantial capability, availability and need. After this some sensing of public demand, need or opinion is also appropriate in developing a decision. Information on pubic opinion related to roadless area evaluation for Wilderness is included in Appendix C-1.

947. The Wasatch-Cache National Forest should consider wilderness designation in the Rocky Mountain system at the national level.

Response: The evaluation for Wilderness in Appendix C-1 does consider in the "Need" determination how a particular roadless area might add to the National Wilderness Preservation System. The Forest itself is constrained to planning for the lands within the Forest boundary, but it does compare to larger scales when considering what lands would be most needed in recommending more Wilderness.

948. The Wasatch-Cache National Forest should make "sustaining wild ecosystems" the primary goal for designating wilderness.

Response: The goals for Wilderness are primarily set forth in the Wilderness Act (1964), which include both protection of wild ecosystems and providing primitive human recreation opportunities and solitude. Our forestwide goal for Wilderness may not have ordered wild ecosystem protection and appropriate levels of human activity in that order, but the goal as written is not intended in any way to shortchange the protection of the wild setting for correct levels and types of human use. Both are intrinsic to the intent of the law.

949. The Wasatch-Cache National Forest should carry out other actions before recommending any more areas for wilderness designation.

949.1 Enforce existing wilderness regulations

949.2 Provide good management and education

949.3 Explain the balance of resources and the needs of the people
Response: All the items identified in this comment are important for successful land management and to ensure that future generations can have opportunities similar to our own. The revised Forest Plan identifies an objective for enforcement and education that is aimed precisely at this mark. It is clear to us also that achieving good compliance with special orders and improving backcountry behavioral standards is a key to good Wilderness management. Recommending additional Wilderness does come with a commitment to manage it.

Wilderness Criteria

950. The Wasatch-Cache National Forest should clarify how wilderness recommendations are selected.
Response: There is no cookbook or scorecard for how recommendations developed; rather judgment was used given the following inputs. Appendices C-1 and C-2 evaluate roadless areas from two different perspectives: 1) potential for Wilderness, and 2) roadless area values defined by the criteria. Some conclusions may be made about which roadless areas are more valuable as Wilderness by reading and comparing these write-ups. Chapter 2 in the FEIS describes how roadless area management would be handled in each alternative and the extent to which Wilderness recommendations were considered appropriate as part of an alternative theme. The interdisciplinary team and forest leadership then mapped the different alternatives using this information and personal and professional opinions about the areas and their best allocation.

951. The Wasatch-Cache National Forest should apply the wilderness criteria correctly for the Twin Peaks, Mount Olympus, White Pine, and Mount Aire proposed additions.
Response: The fact that recommendations for Wilderness were and can be made in one alternative and not in another has nothing to do with the intrinsic values of the lands in question. Rather the recommendation is based on the perspective of the alternative on how that land should be used. Final decision-making this Forest Plan, and perhaps at some future time, a Congressional Wilderness act designating more Wilderness are not linear, but complex process composed of many different sets of opinions and perspectives related to the same set of lands and the same social system. These complex sets of information and societal desires regarding the Wasatch-Cache have been boiled down into the issues and alternatives presented in the FEIS.

952. The Wasatch-Cache National Forest should reexamine the criteria for wilderness evaluation and the underlying legislation.
Response: The Forest Service has developed its Handbook on Wilderness Evaluation (1909.12, Chapter 7) to interpret relationships between the Wilderness Act (1964) and National Forest Management Act (amended 1982), and so to help planners and the public to work through the contentious process of wilderness recommendation. While the Wilderness Act does not specifically identify the

criteria used by the Forest Service in its Handbook on Wilderness Evaluation, the agency at the Washington Office level legally can and did develop this policy for implementing its responsibilities. Individual national forests are then charged with the tasks of implementing handbook direction, which can include some interpretation, but which should fall within the rubric of the policy. Reexamination of this policy will need to come from higher levels in the organization, and is outside of the scope of this planning effort.

953. The Wasatch-Cache National Forest should not use sights and sounds to disqualify potential wilderness areas.

Response: While the "sights and sounds" of adjacent developed areas are discussed for some roadless areas with regard to their potential for Wilderness, these were not used to veto or disqualify additions to existing Wildernesses. This information along with other inventoried characteristics and alternative theme was considered when developing wilderness recommendations across the range of alternatives. It is the overall consideration and judgment regarding the qualities for and impediments to further recommendations for Wilderness within an alternative context that determined its wilderness recommendation.

954. The Wasatch-Cache National Forest should consider the capability, availability, and need of individual roadless areas in determining wilderness potential.

Response: We did in Appendix C of the DEIS and Appendix C-1 of the FEIS. An array of alternative recommendations for Wilderness is presented in the FEIS.

955. The Wasatch-Cache National Forest should recommend areas for wilderness designation under certain conditions.

955.1 If they are large enough to offer a wilderness experience

955.2 If they are at least 100,000 acres in size, so that prescribed fire can be effectively used as a management tool

955.3 If they are low-elevation areas

955.4 Only if they are in danger of exploitation

Response: We appreciate your perspectives on what constitutes appropriate characteristics for Wilderness. These clearly are important considerations in developing good management for roadless areas. Generally largeness has been considered an important value in preserving of wildland ecosystems. We also are learning that allowing fire to approximate natural fire regimes should improve ecosystem conditions. We know that low elevation areas are not adequately represented in the National Wilderness Preservation System, and development and over-exploitation can disrupt or destroy natural systems. These factors are considered in the evaluation of roadless areas in Appendix C-2 and for Wilderness evaluation in Appendix C-1 to the FEIS.

956. The Wasatch-Cache National Forest should not recommend areas for wilderness designation under certain conditions.

956.1 If it would detract from water production

956.2 If it prohibits grazing
Response: The Wasatch-Cache recognizes the importance of water production from national forest lands. We also know how important grazing livestock can be to individuals and communities that depend on it. These two land uses are often discussed in the evaluation of individual roadless areas for Wilderness in Appendix C-2 in the FEIS, particularly in the describing "Availability" where the potential for conflict of Wilderness designation with existing uses is covered. Generally, Wilderness recommendation by the agency, or later, designation by Congress has had little effect of these aspects of forest use, and wilderness acts passed by Congress tend to "grandfather" these uses in.

Do Recommend Roadless Areas for Wilderness Designation

957. The Wasatch-Cache National Forest should expand wilderness areas.
Response: We recognize your perspective and have provided a range of alternatives in the FEIS, some with large areas of recommended Wilderness and some with no recommendation. The prescription maps that accompany the FEIS show where wilderness recommendations are made; the management prescription of 1.5, described in Chapter 4.B.1. of the Forest Plan described allowed and prohibited used in recommended Wilderness; and desired future condition statements give other information on how these areas might appear in the future.

958. The Wasatch-Cache National Forest should recommend additional wilderness areas to achieve its stated objective
Response: The comment suggests that the best way to meet forest concerns for the preservation of biodiversity is through recommending most roadless areas of the forest as Wilderness. While the biodiversity and viability issue is a key one identified in the FEIS (See Chapter 1, Issue 3), it is only one of several that drove the planning effort. Most of the other issues, aside from the one on roadless area management, had to do with human uses. The solution for the forest plan must be a balancing of appropriate levels of use with protection and sustainability of ecosystem functioning and components. Several choices for how this solution are laid out in the seven alternatives that are analyzed in the FEIS; different recommendations for additional Wilderness are provided as part of each alternative.

959. The Wasatch-Cache National Forest should recommend additional wilderness areas for environmental reasons.
959.1 To link wilderness areas together
959.2 To protect ecological health
959.3 To protect watersheds
959.4 To protect biodiversity
959.5 To protect wildlife
959.6 To protect wildlife habitat
959.7 To protect threatened, endangered, and sensitive species
959.8 To protect golden eagles

959.9 To protect areas from the effects of mining and off-road vehicle recreation

Response: Each of these comments has merit. The FEIS presents a range of alternatives from prescribing Wilderness recommendation for large amounts of roadless areas or to no recommendation for Wilderness. These recommendations are based on the values identified in Appendix C-1 matched with an alternative theme. Wilderness recommendation and if Congress acts, designation, can help protect each of the values itemized above. However, Wilderness recommendation is not the only answer. Values can also be protected with other management direction and prescriptions.

Roadless areas are also considered for maintenance of roadless area values or possible allowance of development. (See Appendix C-1 for an inventory of roadless values.) Your comments were considered in the development and analysis of the alternatives presented in the FEIS. Comments from people who do not share your values were also considered, helping to provide the range of alternatives we have analyzed.

960. The Wasatch-Cache National Forest should recommend additional wilderness areas for social reasons

960.1 To allow research and education

960.2 To benefit future generations

960.3 To preserve the American spirit

Response: The range of alternatives presented in the FEIS provides recommendations of considerable new Wilderness to no new Wilderness. It is true that Wilderness can be a setting for sustaining biodiversity that can benefit environmental appreciation, research, future generations, and the spiritual sense that Americans have that “wild places” still exist in our country and world. We recognized these concerns by building some alternatives that recommend most roadless areas for Wilderness or provide management prescriptions that do not allow much development. The range of alternatives also provides options for the development of some of these areas.

961. The Wasatch-Cache National Forest should recommend additional wilderness for economic reasons to benefit the economy.

Response: The Loomis and Richardson (2000), reference that is cited in this comment does provide information concluding that Wilderness designation can add economic value and social values to an area. Some of these economic benefits are more easily or tangibly estimated in dollar values. Our Appendix C-1 considers how available, capable and needed the roadless areas on the Wasatch-Cache are as additional Wilderness. Some considerations of ongoing uses that add dollars to the economy are addressed. Our economic analysis has not estimated the dollar value of ecosystem benefits, in part because this is not required in our regulations. We do recognize the tremendous value of stable watersheds that produce dependable water supplies, ecosystems with individual species and functional components intact, and wild landscapes that can help energize and invigorate our society either through

direct recreation or reflection on their very existence. These aspects of roadless areas and potential Wilderness recommendation were considered in presenting our range of alternatives.

962. The Wasatch-Cache National Forest should recommend additional wilderness areas.
962.1 All roadless areas
962.2 Winter range areas
962.3 Damaged areas
Response: We have examined all inventoried roadless areas for their potential as Wilderness. No alternative recommends that all roadless should be Wilderness. Our analysis in Appendix C-1 to the FEIS simply did not find that all roadless areas had qualities that made them available, capable, or needed enough to be recommended. Documentation of the roadless areas that are not considered appropriate under any of the analyzed alternatives is part of the planning file.

The values of winter range are important and are considered with respect to impacts from development, use and forage competition in Topic 2, Chapter 3 of the FEIS. Winter range was not specifically analyzed as a characteristic across all roadless areas for Wilderness consideration. It is true that some lower elevation portions of roadless areas that provide winter range could be protected through Wilderness recommendation. This same effect may be achieved by tailoring other management direction. For instance, protection of winter range on the forest could be more specifically addressed through the application of a 3.2 management prescription and a management area DFC specifying winter range protection, than through recommendation of additional Wilderness. The range of alternatives does encompass difference acreages of roadless that are recommended for Wilderness, some of which would provide more winter range in recommended Wilderness than others; this has not been calculated.

Roadless areas with minor damage to vegetation or other attributes were considered for their potential as Wilderness and that analysis is presented in Appendix C-1. In some alternatives, areas with known minor damage were included in recommendations for Wilderness while they were considered inappropriate in other alternatives. We recognize that some healing of areas can occur when passive management and low impact uses are applied to an area, and that for some advocates of Wilderness, recommendation of these areas for Wilderness for curative reasons could seem appropriate.

963. The Wasatch-Cache National Forest should support the wilderness designations proposed by various groups.
963.1 Salt Lake City
963.2 The Salt Lake City Department of Public Utilities
963.3 Save Our Canyons
Response: The recommendations of these three entities are on file with the Wasatch-Cache, and they were considered in the development of the alternative

Wilderness recommendations that were presented in the FEIS. Each of the three presented positions recommending large acreages of roadless in the Tri Canyons as Wilderness. These positions are probably best represented in Alternative 1 and secondarily by Alternative 2.

964. The Wasatch-Cache National Forest should designate the forest as a National Preserve and Wilderness.
Response: This suggestion was not feasible, and not considered with the range of alternatives that were analyzed. The Forest simply has too many developed areas, and too many ongoing uses on which surrounding communities are dependent to preserve the whole or designate it as Wilderness.

965. The Wasatch-Cache National Forest should create non-motorized buffer zones around all wilderness areas to protect ecological and wilderness values.
Response: Section 303 of the Utah Wilderness Act of 1984 specifically prohibits the placement of buffer zones around Wildernesses designated in the act (all but Lone Peak). This section of the act further states, "The fact that nonwilderness activities or uses can be seen or heard from areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area."

Do Not Recommend Roadless Areas for Wilderness Designation

966. The Wasatch-Cache National Forest should not recommend any more areas for wilderness designation.
966.1 Because enough area is already designated wilderness
966.2 Because 80 percent of Utah is already owned by the federal government
966.3 Because these areas should be kept open to multiple use
966.4 Because a wilderness designation does not prohibit private landowners from using their land in a manner that is incompatible with wilderness values
Response: We understand the perspective of commenters who do not want additional Wilderness recommendations, and have provided Alternatives 4 and 5 that cover this position. Other members of the public feel that some or much more additional Wilderness is desirable, and we have also presented alternatives that address these positions.

The Wasatch-Cache recognizes that large portions of the state are public lands (federal, state, and local), and that we must responsibly manage that portion which has been entrusted to our care.

Wilderness management is multiple-use management. Many different uses are allowed in designated Wilderness, and framers of Wilderness legislation had to consider how the intent of Wilderness could be interwoven with the intent of the Multiple-Use Sustained-Yield Act of 1960. Section 4 (a) (1) of the Wilderness Act of 1964 states "Nothing in the Act shall be deemed to be in interference with the purpose for which national forests are established as set forth in the in the Act of

June 4, 1897 (30 Stat. 11), and the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 stat. 215)."

We recognize that private landowners can do as they like (within legal limits) with their own property, which may be adjacent to designated Wilderness or adjacent to roadless areas that must be considered for potential Wilderness. We considered this factor as we wrote Appendix C-1 and the alternatives in the FEIS.

967. The Wasatch-Cache National Forest should not recommend any more areas for wilderness designation for environmental reasons.
967.1 Because these areas can be adequately protected with careful stewardship
967.2 Because a wilderness designation precludes management tools needed for forest health
Response: We recognize your perspectives regarding Wilderness recommendation. We have alternatives presented in the FEIS that both recommend substantial Wilderness additions (Alternatives 1, 2, 3, 6, and 7) and recommend none (Alternative 4 and 5). It is true that many of the natural and social/recreational values of an area can be protected without a Wilderness recommendation, and that the application of "minimum" tool philosophy to Wilderness management can limit the use of some technology for work in an area. It is, in part, because of your perspective that we have developed a range of alternatives for managing roadless areas and in our Wilderness recommendations.

968. The Wasatch-Cache National Forest should not recommend any more areas for wilderness designation for social reasons.
968.1 Because areas should remain open for future generations
968.2 Because motorized access is needed for the elderly
968.3 Because it would restrict recreational access
Responses: There is a range of opinions among the elderly, those with disabilities, and all the public regarding motorized access to national forest lands and Wilderness recommendations. Your comments that suggest motorized or otherwise assisted access into areas is an important value to the public were considered in the development of alternatives for Wilderness recommendations.

969. The Wasatch-Cache National Forest should not recommend any more areas for wilderness designation for economic reasons because wilderness designations hurt the economy.
Response: We recognize your perspective that more Wilderness will hurt the economy through lessening use and sales of ATVs, snowmobiles, or other motorized recreation outdoor equipment. We also have recognized that the motorized recreation segment of local economies is "an important contributor to local businesses." (FEIS, Chapter 3, Social and Economic section.)

Our range of alternatives includes those that recommend more Wilderness and some that do not. Additionally, Alternative 7 provides that snowmobiles can be used in

recommended Wilderness if existing travel plans allowed winter motorized snowmobile use. The Social and Economic section in the FEIS specifically includes in the analysis within recreation labor income and employment those sectors of the economy that make up motorized recreation (ATV and snowmobile, 4 wheel drive and gasoline sales), as well as other related components of recreation. Consequently, we think that the range of alternatives and their effects have considered your concerns.

970. The Wasatch-Cache National Forest should not create de facto wilderness areas.
970.1 By adding more restrictions to proposed roadless areas
970.2 By managing recommended wilderness areas for wilderness values
Response: Within our range of alternatives there are different allowed activities prescribed for recommended Wilderness. Chapter 2 in the FEIS itemizes the allowed activities possible in MPC 1.5, Recommended Wilderness. Alternative 1-6 tend to be about the same with regard to managing 1.5; Alternative 7, developed after comments were received on the DEIS has somewhat different allowances (including snowmobile access where it existed before recommendation) both for the public and for Forest Service management. Alternative 7 management prescriptions for 1.5 were developed, in part, with your concerns in mind.

Site-Specific Wilderness Recommendations

971. The Wasatch-Cache National Forest should recommend additional wilderness areas.
Response: We recognize that many people support recommending a large amount of additional Wilderness. Alternative 1 recommends the most Wilderness (See FEIS, Chapter 3, Topic 5), but additional Wilderness is recommended in 5 of our 7 alternatives.

972. The Wasatch-Cache National Forest should recommend additional wilderness areas in the Bear Management Area.
Response: No Wilderness is recommended in the Bear Management Area under any Alternative. Consideration of the values for Wilderness presented in Appendix C-1 to the FEIS for capability, availability, and need of additional Wilderness in the Swan Creek, Rock Creek-Green Fork, and Sugar Pine roadless areas was relatively low for a variety of reasons. Please review FEIS Appendix C-1 for further information.

973. The Wasatch-Cache National Forest should recommend additional wilderness areas in the Cache Box Elder Management Area.
973.1 Areas Adjacent to Mount Naomi
973.2 Areas in Logan Canyon
973.3 Water Canyon
973.4 Wellsvilles

Response: Alternatives 1 and 2 provide substantial Wilderness recommendations for Mt. Naomi Wilderness and some smaller additions in the Wellsville Mountain Wilderness. Other alternatives provide less or none. The details of these choices and effects are considered in the FEIS under Topic 5 in Chapter 3.

974. The Wasatch-Cache National Forest should recommend additional wilderness areas in the North Wasatch Ogden Valley Management Area.
974.1 Mollens Hollow
974.2 Areas near Ogden
974.3 Burch Creek
974.4 Francis Roadless area
974.5 Upper South Fork
974.6 Lewis Peak
974.7 Areas surrounding the Bonneville Shoreline Trail
Response: We inventoried and considered the values for Wilderness of each of these areas in Appendix C in the DEIS (Appendix C-1) in the FEIS. Each of the commenters suggested that some or all of these areas could be recommended as Wilderness. The Forest Plan revision interdisciplinary team looked at each area again to consider their character and see if Wilderness recommendation might be appropriate. Upper South Fork Roadless is recommended for Wilderness in several Alternatives. Additional recommendations for Wilderness were made in Alternative 1 (changing the management prescription map) beyond what was provided in the DEIS for Lewis Peak, and portions of the Willard and Francis roadless areas. The interdisciplinary team review of Mollens Hollow roadless area found that it was not appropriate for Wilderness recommendation under any of the Alternatives. In the development of Alternative 7, the values for Wilderness of these areas were also considered, and while these areas were not recommended for Wilderness in the alternative, substantial portions of them were placed in MPC 2.6, Undeveloped Areas. A review of the MPCs in Chapter 4 of the Forest Plan or Management Prescription maps for Alternatives 1 and 7 from the DEIS and FEIS allows one to review these situations.

975. The Wasatch-Cache National Forest should recommend additional wilderness areas in the Central Wasatch Management Area.
975.1 Tri-Canyon Area
975.2 Twin Peaks
975.3 Gobbler's Knob
975.4 Mount Aire
975.5 Red Butte Canyon and Mueller Park
975.6 Grizzly Gulch
975.6 Lone Peak
Response: As mentioned in response 974 above, we inventoried and considered the values for Wilderness of each of these areas in Appendix C in the DEIS (Appendix C-1) in the FEIS. Each of the commenters suggested that some or all of these areas could be recommended as Wilderness. The Forest Plan revision interdisciplinary team looked at each area again to consider their character and see if Wilderness

recommendation might be appropriate. All mentioned areas are within the general Tri-Canyon area of the Salt Lake Ranger District.

Most of Twin Peaks roadless area is recommended for Wilderness in Alternative 1, and smaller portions in Alternatives 2 and 3. So this area has been considered as Wilderness in the revision process.

Gobbler's Knob is found within part of the Mt. Olympus roadless area, and this portion of the roadless area is recommended for wilderness in Alternatives 1, 2, and 3. Consequently, there has been consideration of this area as Wilderness in the revision process.

Most of the Mt. Aire roadless area was recommended for Wilderness in Alternative 1. Other alternatives did not recommend it. The area is generally perceived as marginal potential for Wilderness given presence of substantial Wilderness already in the general area and other factors. Appendix C-1 to the FEIS reviews its potential for Wilderness.

Red Butte and Mueller Park roadless areas were added to the roadless inventory since the DEIS as a result of this comments, and considered for their values as potential Wilderness or for roadless area values. (See Appendices C-1 and C-2.) The review of Red Butte and Mueller Park roadless areas determined that neither was appropriate for Wilderness recommendation under any alternative.

Grizzly Gulch, near Alta ski area, is primarily composed of private lands, is not in an inventoried roadless area, and is not capable, available, or needed as an addition to Wilderness.

Additions to Lone Peak Wilderness are considered in Alternatives 1 and 2. See Appendices C-1 and C-2 to the FEIS.

976. The Wasatch-Cache National Forest should recommend the proposed Mount Olympus wilderness addition.

Response: Alternative 1 in the FEIS considers and recommends most of the Mt. Olympus roadless area as Wilderness. Two other alternatives (2 and 3) recommend about 20% of the roadless area be added as Wilderness. We understand that proponents of watershed protection, wildlife species and habitat, threatened vegetation, and non-motorized summer and winter recreation have a stake in this perspective (as do the values and species they represent), and we have considered these positions in our FEIS.

977. The Wasatch-Cache National Forest should exclude certain areas from the proposed Mount Olympus wilderness addition.

Response: A range of alternatives is presented in the FEIS in Chapter 3, Topic 5 that recommends most of the Mt. Olympus roadless area as Wilderness in Alternative 1, to recommending none of it in 4 alternatives. The decision maker for

this roadless area has been given a broad range of alternatives and effects to consider in making a decision, and your position has been identified within this range of alternatives.

978. The Wasatch-Cache National Forest should recommend White Pine Canyon for wilderness designation.
Response: White Pine roadless area is recommended for Wilderness in Alternatives 1 and 2. In five other alternatives it is not. Your opinion and the opinions of other are considered in the range of alternatives for this area.

979. The Wasatch-Cache National Forest should not recommend White Pine Canyon for wilderness designation.
979.1 Because the area is already sufficiently protected
Response: White Pine roadless area is not recommended for addition to Wilderness in five of the seven alternatives analyzed in the FEIS. With the exception of comment 979.2 and 979.5 above, we recognize the perspectives of the comments above, and have considered them through these alternative treatments.

979.2 Because grazing and winter motorized use should be allowed to continue
Response For 979.2: Grazing is not allowed under any Alternative. It must be noted that grazing is not now allowed in the White Pine area as it is within the Salt Lake City municipal watershed, and this use has not been allowed for many years; winter motorized use, through helicopter skiing is allowed in several alternatives (3-7), although it is not allowed in Alternatives 1 and 2.

979.3 Because helicopter skiing should be allowed to continue
Response: See response 979.1.

979.4 Because the area contains too many roads and other improvements to be considered for wilderness designation
Response: See response 979.1.

979.5 Because it will prevent access to private inholdings
Response For 979.5: Access to private inholdings must be allowed by law. The Forest Service cannot deny access to private property held within national forests. This is not a decision that is either within the authority of the Forest Service or within the scope of this forest plan.

980. The Wasatch-Cache National Forest should recommend additional wilderness areas in the Stansbury Mountains Management Area, ie Stansbury Mountains and Deseret Peak Areas.
Response: Our range of alternatives for wilderness recommendation in the Stansburys goes from recommending nearly all of the local roadless area for Wilderness in Alternative 1, to recommending none in four alternatives. The inventory of roadless areas for Wilderness values and roadless for other roadless area values is contained in Appendices C1 and C-2 respectively in the FEIS. Topic

5 in Chapter 3 of the FEIS discusses the alternatives for Wilderness recommendation and roadless values. The decision-maker has been given range of choices from which to build a decision for the area and the forest in general.

981. The Wasatch-Cache National Forest should recommend additional wilderness areas in the Western and Eastern Uintas Management Areas.
981.1 Areas Adjacent to Lakes, and Uintas North Slope
981.2 Boundary Creek
981.3 Burnt Fork/Thompson Fork/Kabell Creek
981.4 Hayden Fork/Main Fork/Stillwater/Boundary Creek
981.5 High Uintas
981.6 Lakes Roadless Area/proposed Mount Watson Wilderness
981.7 Nobletts
981.8 Stillwater Creek
981.9 Middle Fork, Blacks Fork, and West Fork Beaver Creek
981.10 Widdop Mountain
Response: Many commenters provided general and detailed support for recommendations of additional Wilderness in the Uintas Range. The itemized areas above were extracted from individual comments in of support for Wilderness recommendation for each area. The range of alternatives presented in the FEIS provides Wilderness recommendations of almost all of these roadless areas to Wilderness in Alternative 1, and lesser amounts in Alternatives 2, 3, 6 and 7. Detailed discussions of the values of these areas as Wilderness can be found in Appendix C-1 to the FEIS. Discussions of other values associated with their roadless character can be found in Appendix C-2. Our range of alternatives accounts for situations in which these values might be protected or might be placed under prescriptions where more development is allowed.

982. The Wasatch-Cache National Forest should recommend the Mount Naomi Roadless Area for wilderness designation.
Response: Most of the Mt. Naomi roadless area is recommended for Wilderness in Alternative 1. Alternatives 2, 3, and 6 also make recommendations for several 1000 acres, while Alternative 7 recommends 500 acres adjacent to recommended Wilderness on the Caribou National Forest. Two alternatives, 4 and 5, recommend no new Wilderness here or forestwide, satisfying those who have an opposite perspective on Wilderness recommendation from your own.

983. The Wasatch-Cache National Forest should not base its needs assessment for additional wilderness solely on recreational criteria for the Mount Naomi Roadless area.
Response: Alternative 1 recommends most of the Mt. Naomi Roadless area for Wilderness, and Alternative 2 recommends much of it. The analysis of the need for additional Wilderness analyzed in Appendix C of the DEIS for Mt. Naomi roadless area did have several references to the recreation values of the area, but it is clear in this inventory that significant wildlife and plants are present that are also considered

for potential as Wilderness. We think that the range of Alternatives covers the possibilities and analysis that you suggest.

984. The Wasatch-Cache National Forest should extend wilderness designations back to the trailheads on every drainage across the North Slope.
Response: The range of alternatives developed in the FEIS encompasses situations in which larger recommendations for Wilderness would extend wilderness to existing trailheads. If large new Wilderness recommendations (Alternatives 1 or 2) or even smaller recommendations are decided on (Alternatives 3, 6, or 7) local implementation decisions for managing at the edges and interiors of new recommended Wilderness will need to be made. Site-specific management at trailheads, essentially requiring Wilderness behaviors and uses from trailheads to Wilderness boundaries might also be a solution to your concern.

Topic 6: Suitable Timberlands

Suitable Timberlands General

985. The Wasatch-Cache National Forest should modify the standards and guidelines related to timber management.
985.1 To define and further develop "standard restrictions"
985.2 To protect scenic river eligibility
985.3 To establish a skidding prohibition at a lower slope than 40 percent
985.4 To close loopholes for timber sales in Guidelines 58 and 59
985.5 To protect trails during timber sales and other vegetation management
Response: The Forest Plan identifies general standards and guidelines that apply to all management prescriptions. Project level analysis will determine necessary management requirements based on site conditions, and will address protection of system trails, scenic river eligibility, and other resource values to be maintained or improved.

986. The Wasatch-Cache National Forest should clarify timber management prescriptions in the Forest Plan by including species-specific road density requirements and management direction.
Response: Species-specific road densities is impractical when one considers the 300+ vertebrate species that may use the Forest. Chapter 3, Topic 3, and Appendix B5 in the FEIS discuss roads analysis and densities, as does Topic 3 in the Revised Forest Plan.

987. The Wasatch-Cache National Forest should require the timber industry to restore harvested areas.
Response: Post-sale activities and requirements/restrictions on logging activity are determined during the analysis conducted under NEPA. The contract provisions are selected to insure that the identified requirements are implemented on the ground during the term of the contract. Timber sales are monitored during the term of the contract to insure the purchaser is in compliance with contract specifications.

988. The Wasatch-Cache National Forest should scientifically manage vegetation resources to ensure restoration of biodiversity.
Response: Each alternative addresses vegetation management with a combination of mechanical treatments and the use of prescribed fire. Restoring biodiversity is an objective of most alternatives, but the method used for restoration varies between alternatives. Harvest will be used in some areas, but where harvesting is restricted by physical, biological or management constraints, prescribed fire is the primary tool to restore biodiversity.

989. The Wasatch-Cache National Forest should review timber suitability per the Alternative 7 management prescription category.
Response: Timber suitability analysis has been conducted in accordance with planning regulations and is included in Appendix B.

990. The Wasatch-Cache National Forest should consider alternatives to timber harvesting to keep roadless areas intact.
Response: Thank you for your comment. Roadless areas are addressed in all alternatives. Preservation of all existing roadless areas is included in several alternatives (1,2,6), and the remaining alternatives protect roadless areas to varying degrees through the application of MPCs.

Adequacy of Analysis

991. The Wasatch-Cache National Forest should clarify existing tables and provide additional tables in the Final EIS that indicate "total suited acres" and "tentatively suited lands."
Response: Tables have been reviewed and we have attempted to make them more clear and correct inaccuracies. Table TM-2 Chapter 3) presents the suited acres and unsuited lands where timber harvest is allowed.

992. The Wasatch-Cache National Forest should provide a more thorough analysis in compliance with the Forest Service Manual.
992.1 By providing sufficient analyis in the Final EIS
992.2 By using FORPLAN to calculate allowable sale quantity and long-term sustained yield
992.3 By providing sufficient information in the Forest Plan
Response: Timber suitability and ASQ information has been reformatted in the Forest Plan to include additional information and in the format in the planning regulations. This information is included in Appendix B. The planning regulations do not require the use of FORPLAN, but require estimating the goods and services, activities, and investments to be implemented or produced by decade and display them.

993. The Final EIS should provide a complete analysis of the cumulative effects of logging on threatened wildlife, including predators.

Response: "Threatened and Endangered" are defined by law in the Endangered Species Act (ESA). The Forest has only one threatened predator species, the Canada lynx, and one endangered species, the black-footed ferret which is classified by the State and the U.S. Fish and Wildlife Service (FWS) as being historical on the Wasatch-Cache (and all other areas of the State except the Uintah Basin where it has recently been reintroduced. All Federally listed, candidate, and proposed species that the FWS has identified for the Forest are discussed in the Biological Assessment as required by the ESA and under species-at-risk in Appendix B2 of the FEIS.

994. The Final EIS should disclose the adverse effects of timber sales on atmospheric carbon levels in order to comply with the Global Climate Change Prevention Act.

Response: The Global Change Prevention Act directs the Secretary of Agriculture to study global climate change and its affect on farms and forests in the United States, and to identify alternative management strategies for temperate and tropical forests that may mitigate any negative effects of global climate change. The long-term effects of climate change are beyond the scope of this Forest Plan.

995. The Wasatch-Cache National Forest should modify the discussion of timber suitability in the Final EIS.

995.1 By including more recent monitoring data

995.2 By describing timber supply and demand

995.3 By explaining what triggers a timber sale outside of the timber prescription or suitable base

Response: There has not been a published monitoring report since 1992. However, resource monitoring at the project level has been ongoing since the report was issued. The most recent information from this monitoring was incorporated into the analysis. Quantifying the demand for timber is difficult because mills outside the local area are now purchasing timber from the Wasatch-Cache, and they are not totally dependent upon timber from this forest for their supply. We have tried to improve the timber demand discussion in an attempt to better describe the local market. There is no specific triggering mechanism for timber sales on unsuitable lands that permit timber harvest. The purpose for the proposed treatment would be identified in the project level analysis. Timber harvest on unsuitable lands could be proposed for several purposes, including but not limited to salvage of insect or fire-killed timber, maintenance or improvement of wildlife habitat, and development of PFC.

996. The Wasatch-Cache National Forest should better explain statements regarding the possible benefits of tree removal on wildlife due to improved hunting opportunities.

Response: This statement was in regards to oil and gas leasing. The section on "The Effects on Terrestrial Wildlife From Oil and Gas Activities has been rewritten and the statement is no longer in the document.

997. The Wasatch-Cache National Forest should explain the connection between timber harvest and lynx management for each alternative.
Response: Lynx conservation strategy guidelines specify that management activities shall not change more than 15% of a Lynx Analysis Unit to an unsuitable condition within a 10-year period. The greatest projected forest-wide harvest level (Alternative 5) is about 12,400 acres of suited lands in a decade. It is unlikely that this level of activity will exceed the conservation strategy limits for change in a decade. However, site-specific analysis will determine the effects of proposed harvest, and may dictate a reduction of treatment acres in a particular LAU. We have discussed this in more detail in the FEIS.

998. The Wasatch-Cache National Forest should discuss timber harvest methods in the Final EIS.
998.1 To clarify the different impacts from fire and clearcuts
998.2 To clarify harvest methods for conifer, lodgepole pine, and aspen
Response: The values for water yield in the DEIS are based on a model that predicts no reduction in water yield for 15 years after conifer harvest and then reduces the water yield to zero linearly from 15 to 60 years after harvest. After the DEIS was released for public comment, a different approach was felt to be appropriate for the assessment of water yield increases. Since Forest Plan revision is broad-level planning, it is felt that it is not appropriate to present specific values of water yield based on assumptions and research that was conducted in very small watersheds that may or may not apply to the Forest-level scale. Therefore, a different analysis presented that is discussed in the section Effects on Soil and Water Resources from Timber Harvest/ Vegetation Treatments under Topic 1, Watershed Health in the FEIS.

We agree the referenced harvest method statement is confusing. It has been reworded in the FEIS to clarify the meaning. Clearcutting is an even-aged silvicultural system, and may be appropriate for lodgepole pine stands and mixed conifer stands dominated by lodgepole pine. Uneven-aged systems will be the preferred system in spruce-fir and mixed stands dominated by spruce and fir. The purpose of clearcutting aspen is to initiate regeneration from root sprouts and provide for future mature stands. Mature aspen stands are very desirable and a major management emphasis is perpetuating such stands over time.

999. The Wasatch-Cache National Forest should continue to research best management practices for timber harvest methods.
Response: Research projects that investigate best management practices and other management options are conducted by Forest Service Research Stations on a continuing basis. At the Forest level, timber sale areas are monitored during and

after harvest to determine effectiveness of prescribed management practices. Adjustments in practices are made if monitoring indicates changes are warranted.

1000. The Wasatch-Cache National Forest should further study aspen ecology before continuing to clear-cut to understand the long-term effects and regrowth potential of aspen.

Response: Past aspen regeneration treatments have been monitored periodically to measure response to the treatments and growth of aspen. A considerable body of information pertaining to aspen management has been developed through research and is reviewed during analysis process. We recognize that some aspen stands are self-sustaining; our focus is on treatment of those stands that are in the process of conversion.

1001. The Final EIS should include a map of suitable timberlands which was not provided in the previous plan.

Response: Suitable timberlands are those forested lands within management prescriptions 5.2 and 6.2. They are mapped as such on alternative maps. This should make them more identifiable than is the case in the current plan.

Allow Timber Harvest

1002. The Wasatch-Cache National Forest should allow timber harvest.

1002.1 With some areas protected for recreation

1002.2 For forest health

1002.3 With no restrictions based on protection of species not sited in the area

1002.4 With restoration considerations

Response: Timber harvest is part of the Forest Service multiple use mission. Management prescription categories that define the management emphasis for an area of the forest were developed to provide a full spectrum of opportunities such as those mentioned. Recreation opportunities, forest health, protection of threatened, endangered and sensitive species habitat, and ecosystem restoration are among the many considerations in timber sale projects.

1003. The Wasatch-Cache National Forest should allow public fuel wood collection.

1003.1 To reduce fire hazards, warm households, and finance maintenance backlogs

1003.2 To prevent waste of natural resources

1003.3 To help clean-up the forest

Response: The Wasatch-Cache offers fuelwood to the public every year, but not necessarily on every Ranger District. The decision to offer or not rests with the individual Ranger Districts, and depends upon the availability of material to offer. The need for snags and down woody material for various wildlife species and other considerations will influence whether fuelwood permits will be offered, where fuelwood cutting will be allowed, how many permits to offer, and when to offer them.

Not Allow/Restrict Timber Harvest

1004. The Wasatch-Cache National Forest should limit timber harvest.

1004.1 To preserve forest health, improve habitat, reduce fuels, and support water output

1004.2 To protect wildlife

Response: Timber harvest is part of the multiple use mission of the Forest Service. Timber harvest from suitable lands may be based on economic reasons. All sales from other lands are for other than economic purposes, such as habitat improvement and fuels reduction. Alternative 2 addresses the concern that harvesting be limited to non-economic purposes.

1005. The Wasatch-Cache National Forest should prohibit timber harvest.

1005.1 Until it completes a proper accounting of timber harvest costs

1005.2 Because of its low economic value in comparison with amenity values

1005.3 To protect the recreational value of the forests

1005.4 To protect the scenic and biologic value of the forests

1005.5 To eliminate damage from timber harvest

Response: The multiple use mission of the Forest Service provides a variety of goods and services from National Forest lands. The Forest Plan identifies a resource emphasis for a given area by means of the management prescription categories. These MPCs provide a mix of uses and identify those areas where timber harvest is appropriate, and those areas where it is not. Although there is no requirement that Forest Service timber sales provide a net return to the Treasury, we do consider the economics of timber in the sale planning process.

1006. The Wasatch-Cache National Forest should prohibit timber harvest in roadless areas.

1006.1 To allow natural forest processes to dominate

1006.2 To preserve ecosystem values

1006.3 To protect forest ecosystems from fragmentation

1006.4 To protect wildlife

1006.5 To preserve roadless values

Response: The FEIS includes Alternative 1 which allows no timber harvest, and Alternatives 2 and 6 which allow no timber harvest in roadless areas. The environmental effects of these alternatives are displayed in Chapter 3 of the FEIS. See FEIS Chapter 3 within the Topic for Roadless areas for a display of how each alternative affects roadless areas.

1007. The Wasatch-Cache National Forest should prohibit timber harvest in roadless areas on the North Slope.

Response: We recognize the importance of roadless areas for all of the above values. The plan approaches the decision on disposition of roadless areas by providing a range of protection depending upon alternative, including preserving all existing roadless.

1008. The Wasatch-Cache National Forest should not use clear-cutting as a timber harvest method.

Response: The widest range of options should be available to meet management objectives. Clearcutting is an acceptable harvesting system for some species under certain conditions. However, whenever clearcutting is prescribed for a stand, it must be the optimum method of achieving objectives and the reason for its use disclosed in the project analysis.

1009. The Wasatch-Cache National Forest should stop using the unscientific concept of forest health to justify its timber commodity program and recognize that insects and disease play vital roles in ecosystem integrity.

Response: We agree that insects and disease play vital roles in ecosystem integrity. However, the decision on whether or not to treat a stand is based on multiple use objectives. Timber harvest may be an effective method to maintain other resource values that may be adversely affected by extensive insect and disease caused mortality.

1010. The Wasatch-Cache National Forest should not use the threat of insects and disease as an excuse to timber harvest.

Response: Harvesting is proposed to develop stand conditions that meet management objectives, including PFC. While endemic levels of insects are not destructive, and may in fact be beneficial, large-scale epidemics can affect the desired condition for the forest, and adversely affect other resources such as recreation and wildlife. In such cases, harvest can have a role to play in achieving the future condition.

1011. The Wasatch-Cache National Forest should not allow timber harvest levels to exceed regenerative capacity.

Response: We agree. Care is taken during the planning process and preparation of the silvicultural prescription, as well as during the implementation and post-sale phases to ensure adequate regeneration is established following harvest.

Insects and Disease

1012. The Wasatch-Cache National Forest should not have a policy of keeping spruce beetle activity at an endemic level.

Response: Thank you for your comment. Decisions on whether to treat insect outbreaks are made based on the anticipated impacts on many forest resources. Response will vary depending upon location and severity of the outbreak, and the threat to forest resources.

1013. The National Forest should not use synthetic herbicides and insecticides for pest management.

Response: Thank you for your comment. We feel that we should have a full range of options available to address the range of disturbances that are experienced across the Forest, and the range of treatment options is reflected in the alternatives.

Herbicides and insecticides can be effective tools to protect high value trees in campgrounds and to control noxious weeds. When used, they are applied directly to the plant to be controlled (in the case of noxious weeds) or the tree to be protected (in the case of campgrounds), to maximize effectiveness and minimize potential effects to non-target species.

Topic 7: Rangeland Capability, Suitability, and Forage Production

Rangeland Capability, Suitability, and Forage Production General

1014. The Wasatch-Cache National Forest should develop improved livestock grazing strategies in the final Forest Plan to improve riparian habitats.
Response: We have identified in Appendix VII of the Forest Plan, riparian classes for streams addressed in the Wild and Scenic River evaluation for the Forest. Those classes are managed to specific desired conditions and utilization standards. In addition, we have added a new forage utilization guideline (G70) for rangelands in unsatisfactory condition (not meeting or moving toward forest plan objectives).

1015. The Wasatch-Cache National Forest should not give grazing a special status in the Forest Plan.
Response: Please see response to concern statement 61. NFMA regulations call for specific decisions to be made regarding grazing on the Forest. We feel that a full spectrum of uses are provided for in the revised Forest Plan through the establishment of an array of desired future conditions, goals, objectives, standards and guidelines that help us manage for many different uses across the forest.

1016. The Wasatch-Cache National Forest should adopt the Gunnison sage grouse guidelines for grazing areas to promote recovery and restoration of sage grouse habitat.
Response: A minor amount of sage grouse habitat occurs on the Wasatch-Cache National Forest and the Gunnison sage grouse guidelines are specific for a subspecies of sage grouse that do not occur on the Forest. Broader guidelines for managing sage grouse habitats (Connelly and others) are incorporated by reference.

Adequacy of Analysis

1017. The Wasatch-Cache National Forest should adequately analyze the impacts of livestock grazing.
1017.1 By analyzing environmental and economic impacts
1017.2 By analyzing site-specific impacts
1017.3 By analyzing whether grazing forecloses other forest uses
1017.4 By documenting the rate of aspen decline
Response: The environmental effects of grazing are disclosed under various resource topics in Chapter 3 of the FEIS and the economic impacts to permittees are provided in the Social Impacts Analysis portion of Chapter 3. These analyses have

been reviewed and in many cases updated and expanded upon in the FEIS. Site-specific analyses are outside the scope of the Forest Plan. A section titled "Alternative Uses Foregone" has been added to the FEIS. A discussion on the rate of aspen decline has been added in Chapter 3 of the FEIS under Topic 2, Biodiversity and Viability, Vegetation. It describes the variety of factors involved with aspen decline, including fire suppression and livestock grazing.

1018. The Wasatch-Cache National Forest should analyze the effects of livestock grazing against the economic benefits.

Response: The effects of livestock grazing are outlined in Chapter 3, Topic 7 – Rangeland Capability and Suitability, Livestock Grazing/Range Management. The cost for grazing an animal unit month (AUM) is set by Congress, as is our budget to manage livestock use on the Forest. While economic suitability is one factor in determining rangeland suitability, it is the ecological conditions of the land that are more heavily determine whether or not to graze and how much grazing should occur, not the economics of livestock grazing.

1019. The Wasatch-Cache National Forest should clarify the relationship between animal unit months and terrestrial conditions.

Response: Livestock use is allowed on suitable rangelands as long as those lands are at, or moving toward desired conditions. These conditions focus on the long-term sustainability of uses on rangelands and the ability to maintain quality watershed conditions, wildlife habitat, and a variety of age classes within those vegetation types.

1020. The Wasatch-Cache National Forest should clarify its discussion of permitted grazing levels in the Draft EIS.

Response: While at the forest-wide scale we can address permitted numbers based on existing and historic use levels, the detailed analysis to revise these numbers up or down is beyond the scope of this analysis. We have estimated the effects of the different alternatives, however, and these are shown in the revised Table RN-2.

1021. The Wasatch-Cache National Forest should justify its rationale for only closing three allotments in the Preferred Alternative.

Response: Five additional vacant allotments are closed in the Salt Lake and Davis County watersheds in the decision alternative (Alternative 7), for a total of 10 of the 13 vacant allotments closed. The other three have not been closed because of the potential to restock them and/or to use them while other allotments are being treated with prescribed fire or wildland fire use.

1022. The Wasatch-Cache National Forest should verify rangeland condition and trend by using verified conditions, not estimates.

Response: The Forest has followed accepted protocols in the assessment of range conditions, using both verified and estimated condition techniques. Because of the vast numbers of acres of rangelands in allotments across the Forest (98 allotments

covering over 300,000 capable rangeland acres), it is not possible to verify conditions annually on all allotments.

1023. The Wasatch-Cache National Forest should provide maps indicating suitable and capable acres for livestock grazing so that better grazing capability determinations can be made.

Response: Maps showing the locations of allotments on the Forest have been added to FEIS Appendix I. Maps are in the planning record that show the different factors used in rangeland capability and suitability analysis, the detail of which is too great to put into the EIS document. Capable acres and suitable acres of rangelands were determined using processes in the Rangeland Capability and Suitability Protocol (USDA Forest Service 2000) and outlined in FEIS Appendix B-9. As noted in this appendix, percent slope, minimum forage production, stable soils, ground cover, and access by livestock (including distance to water) were the factors used in determining capability. In addition, tables are available in FEIS Appendix I that illustrate which allotments are open by alternative and maps are provided that show where these allotments occur. Only those capable acres within these allotments are considered suitable.

1024. The Wasatch-Cache National Forest should provide maps of vacant and used forest allotments including the three sheep allotments, which, if vacated, would benefit bighorn sheep, for reviewers to determine whether the proposed analysis is consistent with the location of the allotments.

Response: Maps showing the location of each allotment on the forest are in Appendix I, which has been added to the FEIS. This appendix addresses current allotment status (open or closed) and allotment status by alternative as well.

1025. The Wasatch-Cache National Forest should publish and distribute maps of grazing activity throughout the year so recreational users can avoid areas where livestock have damaged or closed recreational opportunities.

Response: Because areas that are used at any given time during the grazing season may vary because of annual weather, soil moisture conditions, and rotation systems used on allotments, it would not be possible to accurately display this on maps in a meaningful and accurate way. Recreation users may call the District offices to receive information on where grazing is occurring and when.

1026. The Wasatch-Cache National Forest should modify the VEG-1 table in the Final EIS to indicate deviations from historic range of variation related to stubble heights.

Response: The forest uses stubble height as an indicator of when livestock should be removed from an allotment and does not relate it to historic ecological conditions of rangelands, which is better described by species composition, ground cover, and canopy cover of sagebrush species. Stubble height refers to the height at the end of the growing season. In some areas where early grazing occurs, these heights at the time that livestock leave a pasture may be less that the height identified in the utilization standard.

1027. The Wasatch-Cache National Forest should scientifically determine the animal unit months to be produced from capable lands.

Response: While animal unit months (AUMs) have been estimated for each alternative, the actual AUMs allowed to graze any given allotment is better determined through site-specific analysis that assesses, not only the forage production within an allotment, but also the areas actually used by livestock at the appropriate level of utilization.

1028. The Wasatch-Cache National Forest should analyze fecal coliform and bacterial forms of contamination associated with livestock grazing in the Final EIS to protect water quality.

Response: The effect of increased bacterial concentrations in water from fecal wastes of livestock has been included in the section Effects on Soil and Water Resources from Livestock Grazing under Topic 1 Watershed Health. Analysis of fecal coliform and other bacterial forms of contamination associated with livestock grazing is not appropriate in the FEIS because Forest Plan Revision is broad-scale planning and decides where livestock grazing is allowed. Site-specific water quality problems associated with livestock grazing should be addressed during allotment management plan revisions or during annual permit review process.

Legal Considerations

1029. The Wasatch-Cache National Forest should indicate compliance strategies with the Endangered Species Act with respect to livestock management.

Response: A biological evaluation/biological assessment is on file for this Forest Plan revision, which includes effects on Threatened, Endangered, and Intermountain Region Forest Service Sensitive species. Effects from livestock grazing on these and other species at risk have been described in more detail in Chapter 3, Topic 2 – Biodiversity and Viability.

Rangeland Management

Goals and Objectives

1030. The Wasatch-Cache National Forest should modify the grazing objectives in the Forest Plan.

1030.1 By completing riparian class assignments and utilization standards for all riparian areas on all allotments

1030.2 By modifying the period for range analyses to be applied to the monitoring scheme

1030.3 By analyzing potential increases in forage availability based on the range of potential rates of timber and fire prescriptions

Response: While we have not completed riparian class assignments for all riparian areas of the forest, classes for many of the perennial streams and rivers of the Forest has been added to Forest Plan, Appendix VII. These classes were

determined through an interdisciplinary team process. Utilization standards for each riparian class are identified in the Standards and Guidelines section of the Forest Plan. Site-specific adjustments will be encouraged based on the results of on-going range analysis and monitoring. Timber and fire activities temporarily change the availability of forage and are not included in the analyses for grazing potential, because of their transitory nature. And while it is permissible to include such range in suitable acre calculations, permitted numbers are not adjusted accordingly at the forest-wide scale because of the difficulty in properly assessing these conditions over the long term. Changes can be made through additional site-specific analysis.

Standards and Guidelines

1031. The Wasatch-Cache National Forest should modify standards and guidelines for ranges.

1031.1 By addressing what will be done with vacant allotments

1031.2 By establishing criteria for maintenance of ground cover, vegetation, and soil.

Response: The disposition of vacant allotments is described in the Alternatives portion of the FEIS. Utilization and ground cover standards and guidelines are imposed wherever livestock grazing is permitted. These as well as identified desired conditions, goals, and subgoals provide direction for maintaining ground cover, desired vegetation, and watershed and soil conditions.

1032. The Wasatch-Cache National Forest should comply with state water quality standards within livestock allotments.

Response: The WCNF is required by State law to meet anti-degradation requirements. The Forest Plan has many standards and guidelines that help to meet anti-degradation requirements such as those under sections Watershed Health and Biodiversity and Viability. The states of Utah and Wyoming make determination of whether waters are fully supporting beneficial uses or not. Utah has determined that the waters of the WCNF are fully supporting their beneficial uses except for those listed in Table WA-1. The only water body on the WCNF that is identified as impaired for fecal coliform is Emigration Creek of which Salt Lake County is expected to begin assessing in 2003. The FEIS recognizes that impacts from livestock grazing occurs and is described in the section Effects on Soil and Water Resources from Livestock Grazing under Topic 1 Watershed Health.

1033. The Wasatch-Cache National Forest should not rely on utilization standards to protect stream habitats.

Response: Additional direction has been added to the plan (guideline, G74) that annual operating instructions (and/or Allotment Management Plans) should be evaluated and additional site-specific objectives defined if needed for one or more of five different parameters, including stream bank trampling on key reaches. The Wasatch-Cache National Forest follows the Society for Range Management position statement on utilization dated February 2002 and is quoted below from their web page, http://uvalde.tamu.edu/jrm/jrmhome.htm:

The Society for Range Management recognizes and endorses forage utilization and residue measurements as useful tools in rangeland monitoring, and acknowledges their value in land management. When used with other monitoring information, utilization can be employed to design and evaluate management decisions. These measurements, when properly timed and conducted using appropriate methods and sampling procedures, can be used as an aid in:

Analyzing distribution of animal use on a management unit.
Interpreting cause and effect relationships for observed changes in resource attributes such as soil cover, species composition, residual cover, etc.
Adjusting stocking rates and/or timing of grazing when used in conjunction with other monitoring information including: long term vegetation or habitat data, current and historical stocking records, precipitation records, etc.

Utilization and residue measurements are not management objectives. They are tools to be used with other information in evaluating whether desired resource conditions are being achieved.

Other tools we are using to look at riparian conditions are greenline trend data to assess the condition of the riparian communities immediately adjacent to the streams.

1034. The Wasatch-Cache National Forest should select species to monitor to determine the prescribed utilization standards for livestock grazing.
Response: – While we have suggested some species to monitor utilization, this can and should be modified on a site-specific scale to meet the definition of a key species. As defined, key species, will be indicator species, which show signs of utilization first, and are generally more sensitive to grazing pressures.

1035. The Wasatch-Cache National Forest should require a minimum 8-12 inch stubble height for all upland perennial bunchgrasses at the end of the grazing or growing season.
1035.1 To protect ground nesting bird habitat
1035.2 Management Prescription Categories
Response: The proper use of forage has been focused on the ability of the grazed plants to maintain their viability and to maintain protective ground cover. Habitat requirements for ground-nesting birds are highly variable, and while 8-12 inch stubble height may be advantageous to some ground nesting species, it may be detrimental to others.

1036. The Wasatch-Cache National Forest should not renew grazing permits in the 4.x management prescription categories.
Response: Grazing is not allowed in developed recreation sites, such as developed campgrounds and picnic areas.

1037. The Wasatch-Cache National Forest should not allow grazing in Management Prescription Categories 2.x and 3.x to protect aquatic, terrestrial and watershed integrity.

Response: – It was determined that livestock grazing was not incompatible with Wild and Scenic River status MPCs 2.1, 2.2, and 2.3). Grazing is currently not allowed in Research Natural Areas (MPC 2.4). Grazing does occur on the Mirror Lake Highway and in portions of Logan Canyon, both Scenic Byways (MPC 2.5), but is not incompatible with the values of these areas. Roadless Areas (MPC 2.6) have each been evaluated for the values they contain (FEIS, Appendix C-2). Special Interest Areas (MPC 2.7) were proposed only where existing livestock grazing did not interfere with the values of those areas. Streams and rivers with Bonneville or Colorado River cutthroat trout populations (MPC 3.1) have been classified as Class 1 streams (Forest Plan, Appendix VII), which have the most restrictive grazing management direction.

Suitability/Capability

1038. The Wasatch-Cache National Forest should determine suitable and capable acres in the final Forest Plan.

1038.1 In compliance with Forest Service regulations and the National Forest Management Act requirements for defining suitability and capability

1038.2 Per the Management Prescription Category 7.0 changes

Response: While the determination of both range capability and suitability were done in the draft EIS, capable range has been revised based on new information and suitable range acres have been revised to address specific concerns raised in public comments. These changes can be found in FEIS Appendix B-9, and in Tables RN-1 and RN-4 in FEIS, Chapter 3, Topic 7 – Rangeland Capability and Suitability.

1039. The Wasatch-Cache National Forest should analyze the "economic consequences" and "alternative uses foregone" to determine range suitability.

Response: See response 1017. Additional information on "alternative uses foregone" and "economic consequences" has been added to the FEIS, Chapter 3, Topic – 7 Rangeland Capability and Suitability under the **Direct and Indirect Effects by Alternative, Rangeland Suitability** section. The financial efficiency analysis and budgetary impacts associated with grazing are displayed in FEIS Appendix B9, Table B9-2.

1040. The Wasatch-Cache National Forest should prohibit grazing on lands deemed unsuitable.

Response: Within any give allotment there are both lands considered capable and not capable, and therefore suitable and unsuitable for livestock grazing. Because of the complex nature of landscapes and associated management of these areas within allotments, capable or not, may be grazed by livestock because controlling livestock movements to that level is not possible. The acres of non-capable rangelands (see Appendix B-9), however, are not included in the determination of livestock grazing capacity on the forest.

1041. The Wasatch-Cache National Forest should expand the lands deemed unsuitable for grazing to include the categories listed in the Rio Grande National Forest Landand Research Management Plan.

Response: See response 1023. The Rio Grande National Forest was directed to reanalyze the suitability of their land base to support livestock grazing. Their new analysis used the newly developed Rocky Mountain Region Guidelines for Determining Grazing Suitability. We used the Intermountain Region direction that was available in June 2000 for assessing capability and suitability, but consulted with U.S. Forest Service, Rocky Mountain Region economists and adjusted our analysis to more closely follow the methods they recently used for the analysis for the Medicine Bow National Forest.

Conditions and Trends

1042. The Wasatch-Cache National Forest should implement target range conditions.

1042.1 To ensure grass and browse for wildlife

1042.2 To allow for quick recovery of rangeland when it is not in properly functioning condition

Response: Desired conditions have been outlined for rangelands. A new grazing utilization guideline (30 percent vs. 50 percent for lands in satisfactory condition) has been added for rangelands in unsatisfactory condition to improve and move toward properly functioning conditions.

1043. The Wasatch-Cache National Forest should maintain conditions and trends and not yield to the current emphasis on utilization rates.

Response: Utilization should not be confused with Desired Conditions. The forest follows the Society for Range Management (SRM) position on the use of forage utilization and residue measurements and uses utilization measurements with other monitoring information, to design and evaluate management decisions. We use the difference between desired and existing conditions and monitored trends to identify site-specific management needs to move toward desired conditions, which are described in the Forest Plan under "Desired Conditions – Biodiversity and Viability, Vegetation". Utilization standards and guidelines, based on research, are used as a tool to maintain or reach desired conditions on the ground. We agree with the Society for Range Management (SRM) statement "Utilization and residue measurements are not management objectives. They are tools to be used with other information in evaluating whether desired resource conditions are being achieved" (SRM web page http://www.srm.org, last updated, February 2002).

1044. The Wasatch-Cache National Forest should clarify whether it is using conditions and trends or utilization standards for grazing management.

Response: See response 1043.

1045. The Wasatch-Cache National Forest should conduct a trend analysis every three years.

Response: The Rangeland Health Amendment, which is incorporated into this revised Forest Plan, identified measuring frequency for any given long-term trend study as once every 5 years. Because detectable differences cannot adequately be measured on a more-frequent basis, we will continue with this measurement frequency. There will, however, be trend studies being done every year in order to achieve this frequency on all allotments.

1046. The Wasatch-Cache National Forest should use the Logan Ranger District as an example of good grazing conditions.

Response: Example of good grazing conditions can be found across the forest. We have chosen to not focus on site-specific areas for this analysis.

Properly Functioning Condition

1047. The Wasatch-Cache National Forest should manage grazing to restore Properly Functioning Condition for riparian areas and watersheds.

Response: The purpose of our ground cover standards, utilization standards and newly created utilization guideline for rangelands in unsatisfactory condition is to maintain rangelands currently meeting or moving toward forest plan desired conditions. The purpose is also to move unsatisfactory condition rangelands (those not meeting or moving toward desired conditions) toward desired conditions, which are properly functioning conditions.

1048. The Wasatch-Cache National Forest should report allotments that are not within Properly Functioning Condition in the Forest Plan with appropriate management actions to restore ecological function.

Response: See Response 1047. Regardless of where they occur, rangelands that are not properly functioning will benefit from the direction provided in the revised Forest Plan.

1049. The Wasatch-Cache National Forest should restore rangelands to Properly Functioning Condition of watersheds, riparian areas, and lands in unsatisfactory condition.

Response: See response 1047.

Restoration

1050. The Wasatch-Cache National Forest should identify and restore areas damaged by grazing.

Response: Implementation of guidance outline in the Forest Plan (Desired Future Conditions, Goals, Objectives, Standards and Guidelines) will help restore rangelands in unsatisfactory condition.

1051. The Wasatch-Cache National Forest should require the restoration of all native woody plants in the Forest Plan.

Response: Standard 26 notes that no more than 50% of the current year's growth on woody vegetation is to be browsed during one growth cycle. This was based on research that determined this to be a proper level of use.

Monitoring and Enforcement

1052. The Wasatch-Cache National Forest should monitor and enforce range quality standards and allotment management plans.

1052.1 To protect ecological values
1052.2 To ensure overgrazing does not occur
1052.3 To justify grazing at or near current levels
1052.4 To meet the requirements of the National Forest Management Act
1052.5 To protect wildlife and forest health

Response: As noted in Response 1050 above, the implementation of guidance outline in the Forest Plan will help restore rangelands in unsatisfactory condition. Doing this will protect and improve ecological values; will ensure overgrazing does not occur; will adjust grazing levels to those appropriate for conditions and capability of allotments; and will protect wildlife habitat and the health of the rangelands. We have met the requirements of the National Forest Management Act through this revision process.

Infrastructure

1053. The Wasatch-Cache National Forest should repair denuded allotments with fencing, enclosures, and prescribed fire.

Response: Various tools are allowed to manage allotments, including fences, enclosures, and prescribed fire.

1054. The Wasatch-Cache National Forest should develop a better-managed fencing system.

Response: Fencing systems are more appropriately determined at the site-specific scale, which is outside the scope of this revision process.

1055. The Wasatch-Cache National Forest should set grazing fees sufficient to cover fencing for sensitive riparian areas.

Response: Grazing fees are set nationally and cannot be altered by the Forest.

1056. The Wasatch-Cache National Forest should not fence areas such as Steel Creek Park because this park is a non-grass growing area and money would be better spent on other forms of forest maintenance.

Response: Site-specific proposals are not addressed in the FEIS or Forest Plan.

1057. The Wasatch-Cache National Forest should not allow livestock to use the recreational infrastructure.

1057.1 With penalties for violation
1057.2 To avoid user conflicts
1057.3 Allotments and Permits
1057.4 Allotments
Response: Range suitability is addressed in FEIS, Chapter 3, Topic 7 – Rangeland Capability and Suitability and further described in FEIS Appendix B9. While livestock are not allowed in developed recreation areas, they are still allowed to graze within permitted allotment boundaries. Regardless of recreation uses, as long as rangelands continue to be in satisfactory conditions or are moving toward desired conditions, this is allowed to continue.

1058. The Wasatch-Cache National Forest should reduce the number of grazing allotments available to protect resources.
Response: The number of open allotments has been reduced by 10, with the potential for additional closures if permits are voluntarily waived without preference.

1059. The Wasatch-Cache National Forest should not reduce the number of grazing allotments available.
Response: Only vacant allotments are closed and only those that conflict with bighorn sheep health and habitat in the Uinta Mountains and municipal watersheds in Salt Lake and Davis Counties. Other allotments in the upper elevations of the Uinta Mountains would be closed only if permits were voluntarily waived without preference. All allotments and their status are identified in FEIS, Appendix I.

1060. The Wasatch-Cache National Forest should close vacant grazing allotments in the High Uintas.
Response: See response 1059.

1061. The Wasatch-Cache National Forest should modify the Forest Plan to indicate vacant allotments will remain vacant until an environmental analysis can be completed.
Response: See response 1059.

1062. The Wasatch-Cache National Forest should allow voluntary/permanent allotment retirements.
Response: See response 1059.

1063. The Wasatch-Cache National Forest should measure the benefits of introducing non-native species, which threaten livestock grazing allotments against the economic impact of those introductions.
Response: Bighorn sheep were historically present in the Uinta Mountains. Only vacant allotments are closed on the eastern portion of the Forest. Bighorn sheep would not be used as a reason to close an allotment. Other allotments in the upper elevations of the Uinta Mountains would only be closed if permits in bighorn sheep habitat were voluntarily waived without preference. As such, no direct economic

impacts would occur because of bighorn sheep. However, impacts to communities, either local or otherwise, may occur. It is difficult to predict whether or not any of these permits would be voluntarily waived during the planning period. And because a permit can be issued to anyone meeting the basic requirements, wherever they may live, impacts in any given community are unknown.

1064. The Wasatch-Cache National Forest should review management allotment plans for the Bear Management Area and reduce livestock numbers.
Response: This site-specific analysis is outside the scope of this revision process.

1065. The Wasatch-Cache National Forest should close the Gilbert Creek, Henry's Fork, and Smith's Fork allotments.
Response: The Gilbert Peak, Henry's Fork-Hessie Lake, and Red Castle allotments would be closed if permits are waived without preference. Gilbert Creek and West Fork Smiths Fork allotments do not pose threats to bighorn sheep health and are not proposed for closure.

1066. The Wasatch-Cache National Forest should phase out over 10 years the Gilbert Creek, Henry's Fork, and Smith's Fork allotments.
1066.1 To protect the North Slope
1066.2 To protect big horn sheep
Response: See response 1065.

Permits

1067. The Final EIS should state the number of grazing permit holders on the forest to correct the misstatement that there are a "large number" of them.
Response: There are approximately 150 permit holders on the Forest. This number has replace "large number" in the FEIS under the social-economic section. Of these, approximately 52 grazing permits are on the north slope of the Uinta Mountains accounting for about 39 percent of all cattle grazed on the Wasatch-Cache and about 40 percent of all sheep grazed.

1068. The Wasatch-Cache National Forest should honor existing grazing leases but allow the leases to phase out.
Response: While not applied Forest wide, most allotments in the upper elevations of the Uinta Mountains will be closed if permits are voluntarily waived without preference.

1069. The Wasatch-Cache National Forest should allow permittees to voluntarily waive grazing permits to protect wildlife and watershed values.
Response: Permits may be voluntarily waived without preference. Restocking all allotments other than those identified in the upper elevation of the Uinta Mountains, would be addressed on a site-specific basis because no overriding wildlife issues are present elsewhere on the Forest.

1070. The Wasatch-Cache National Forest should include an accountability clause in grazing permits with conditions for reductions if permit terms are not met.
Response: The Term Grazing Permit (FSM 2230) provides the equivalent of an accountability clause.

Subsidies

1071. The Forest Service should not subsidize grazing because it harms the environment and livestock produced on public lands does not contribute significantly to America's food supply.
Response: As noted in response 1055, grazing fees are set nationally and cannot be altered by the Forest.

Grazing

Allow Grazing

1072. The Wasatch-Cache National Forest should allow grazing.
1072.1 With appropriate management to protect forest resources
1072.2 For the benefit of forest resources
Response: The forest continues to allow grazing, while providing direction that protects rangeland resources and moves unsatisfactory rangelands toward desired future conditions.

1073. The Wasatch-Cache National Forest should allow grazing in roadless areas.
Response: An evaluation of each individual roadless area has been added to FEIS, Appendix C. Grazing has not been removed from any roadless area.

1074. The Wasatch-Cache National Forest should allow grazing because it contributes to the economy.
1074.1 For rural counties in Utah
1074.2 For the ranching industry
Response: Because only some vacant allotments are closed, the impacts to the existing economy will not be adversely affected.

1075. The Wasatch-Cache National Forest should support grazing and allow managers to assess future conditions by selecting Alternatives 3 or 5.
Response: Only broad desired future conditions are identified at the Forest wide scale, and these do not vary by alternative. These should be refined at the site-specific scale to identify those species that should occur and other characteristics that should be managed for.

Do Not Allow/Restrict Grazing

1076. The Wasatch-Cache National Forest should phase out grazing.
1076.1 To return to properly functioning condition

1076.2 To allow vegetation to be restored
1076.3 To prevent economic, ecologic, and aesthetic impacts
1076.4 To protect bighorn sheep
Response: See responses 1068 and 1069. Our newly defined utilization guideline (G70) will help improve the rate at which these rangelands move toward desired condition. Regarding bighorn sheep habitat, see response 1063.

1077. The Wasatch-Cache National Forest should eliminate grazing wherever necessary to protect at-risk plant communities.
Response: Grazing on the Wasatch-Cache National Forest has not been shown to negatively effect the rare plants that occur here. Most species that could be affected by grazing do not occur in grazing allotments.

1078. The Wasatch-Cache National Forest should eliminate grazing in areas closed to motorized recreation.
Response: Livestock and vehicles each have different effects on wildlife and their habitats. Possible livestock/wildife conflicts are generally indirect. While livestock use of forage may occur on the same plant species that wildlife use, our stocking rates take wildlife needs into consideration. Motorized vehicle use can disrupt wildlife directly altering their distribution and ability to access their preferred habitat.

1079. The Wasatch-Cache National Forest should restrict grazing.
1079.1 Until condition and trend are verified
1079.2 To protect water and aquatic resources
1079.3 To preserve recreational experiences
Response: Our determination of range condition covers approximately 80 percent of rangeland acres within allotments on the Forest. Of these acres, approximately 7 percent have conditions that have been verified, 93 percent estimated. As noted in Response to concern statement 1022, the Forest has followed accepted protocols in the assessment of range conditions, using both verified and estimated techniques. Because of the vast numbers of acres of rangelands in allotments across the Forest (98 allotments covering over 300,000 suitable rangeland acres), it is not possible to verify conditions annually on all allotments. The riparian class evaluation has been applied to all river and stream segments evaluated for wild and scenic river status and is included in Forest Plan Appendix XII. The most restrictive grazing standards and guidelines apply to those segments that have either Bonneville or Colorado cutthroat trout. Grazing has been eliminated in the Salt Lake and portions of the Davis County watersheds. Water quality for all those watersheds used for public drinking water supply do not exceed State water quality standards as a result of livestock use. Conflicts between livestock and recreational uses on the Forest are recognized and livestock use has only been eliminated from developed recreation areas. Because of wide ranging values for different uses on the Forest it is difficult to maintain one experience at the expense of another.

1080. The Wasatch-Cache National Forest should reduce grazing throughout the Forest.

1080.1 By 25 percent

1080.2 To reach biodiversity goals

1080.3 To prevent topsoil erosion, ground terracing, and vegetation destruction

1080.4 To restore streams for fishing

Response: Grazing numbers throughout the Forest are better determined through site-specific analyses of conditions, trends, and the relationship of rangelands to the desired conditions of those lands. The utilization standards and guidelines are based on research that maintains the health and reproductive capability of rangeland plant species. In addition, they are designed to help rangelands move toward desired conditions for plant and animal communities, prevent soil erosion and to maintain or improve riparian areas, including habitat for fish.

1081. The Wasatch-Cache National Forest should not allow grazing levels to exceed regenerative capacity.

Response: See Response 1080.

1082. The Wasatch-Cache National Forest should prohibit grazing.

1082.1 To preserve ecological values

1082.2 To reduce fire hazard

1082.3 To prevent the spread of noxious weeds

1082.4 To preserve scenic quality

Response: Implementation of the grazing utilization standards and the guidelines added for rangelands in unsatisfactory condition, will help move these areas toward desired conditions. Grazing has been shown to reduce fire hazard in some rangelands, although those where cheatgrass dominates the understory remain high fire hazard areas because of the flashy nature of the associated fuels. On the Wasatch-Cache National Forest, it has been determined that most noxious weeds occur along highways, roads, and trails, indicating that noxious weed spread, while associated to some degree with livestock use, is more associated with human travel ways. There are areas of the forest where livestock grazing has affected the scenic quality. In general, these areas are also ecologically unsatisfactory and will be managed to move toward desired conditions. As these sites move toward desired ecological condition, visual qualities will improve as well.

1083. The Wasatch-Cache National Forest should prohibit grazing because of its introduction of Tubifex, a host for the whirling disease parasite of trout

Response: We recognize the importance of trying to reduce the spread of whirling disease on National Forest Lands. We also recognize the part the tubifex worm plays in the life cycle of this parasite that causes this disease. We realize that as habitat for the worm increases the potential for increasing the tubifex population increases. So far in Utah we have not seen major mortalities from whirling disease. We believe that as we implement the grazing standards and guidelines identified in the FEIS, the in-channel and riparian habitat will be maintained or improved thus

reducing the habitat for the tubifex worm and the threat of whirling disease outbreaks.

1084. The Wasatch-Cache National Forest should prohibit grazing in certain areas.
1084.1 In the entire forest
1084.2 In roadless areas
1084.3 In wilderness areas
1084.4 Near Wild and Scenic Rivers
1084.5 In severely impacted riparian areas and stream banks
1084.6 In watersheds and riparian areas
1084.7 In areas with aspen and conifer stands
1084.8 In Logan Canyon
1084.9 In the North and Middle Forks of High Creek, Cottonwood and Blind Hollow, Spawn Creek, Bunchgrass Drainage, Steam Mill Canyon, and Steep Hollow, Smithfield Dry Canyon, Birch Canyon, and the T.W. Daniels Forest
1084.10 Along the Mirror Lake Highway and the upper wetlands of the Provo, Duchesne, Weber, and Bear Rivers
1084.11 In the western drainage of Mount Naomi Wilderness and south-facing drainage in Logan Canyon
1084.12 On the east slopes of Mount Naomi Wilderness
1084.13 In the Mid Bear River Range
1084.14 South of Hardware Ranch
Response: Site-specific decisions to allow or not allow livestock grazing are outside the scope of this analysis.

1085. The Wasatch-Cache National Forest should prevent overgrazing in watersheds by alternating grazing by location and year.
Response: We encourage rotation systems, either rest rotation where entire pastures within allotments are rested each year, or deferred grazing where the order in which pastures within allotments are grazed is rotated from year to year. This, coupled with utilization standards and guidelines, will help move rangelands toward desired conditions.

1086. The Wasatch-Cache National Forest should not allow motorized access for grazing purposes to protect wilderness areas.
Response: The 1984 Utah Wilderness Act 1984 states, "Grazing of livestock in wilderness areas established by this Act, where established prior to the date of the enactment of this Act, shall be administered with section 4(d)(4) of the Wilderness Act and section 108 of Public Law 96-560." Forest Service Manual 2320 direction, under Exhibit 1, Congressional Grazing Guidelines, is consistent with this Act. The Manual states, "Where practical alternatives do not exist, maintenance or other activities may be accomplished through the occasional use of motorized equipment." It goes on to describe the conditions and gives examples of appropriate uses of motorized vehicles in wilderness.

Topic 8: Special Designations

Special Designations General

1087. The Wasatch-Cache National Forest should designate more lands for protection. If the final decision allows more landscape impacts than the Preferred Alternative.

Response: The revised forest plan provides direction for assessing the possible addition of two Research Natural Areas; one near Ben Lomond Peak for its Tall Forb plant communities and one on the western portion of the Deseret Peak Wilderness for its Great Basin plant communities and the potential to study cryptogamic soil crusts. In addition, within the Tri-Canyons area east of Salt Lake County there is the potential for the identification and establishment of one Special Interest Area.

1088. The Wasatch-Cache National Forest should continue to make special designations for Research Natural Areas and Wild and Scenic Rivers. With no consideration for political positions.

Response: The Forest can only recommend rivers for Wild and Scenic River designation. As with wilderness, Congress has the authority for designating Wild and Scenic Rivers. We have proposed additions to the existing Morris Creek Research Natural Area (RNA) and have proposed additional areas be investigated in the future for RNA status (see response to concern statement 1087). It is the value of these areas that are the primary consideration in their recommendations and establishment.

Research Natural Areas

1089. The Wasatch-Cache National Forest should identify in the Forest Plan potential areas that could contribute to diversity in the Research Natural Area system.

Response: See Response 1087.

1090. The Wasatch-Cache National Forest should selectively expand Research Natural Areas. The Mollen's Hollow Research Natural Area is one of these.

Response: The Mollen's Hollow RNA boundary includes the best of the conditions that occur in that area as well as the most manageable boundary. As noted in the response to concern statement 1089 above, the Morris Creek RNA is proposed for expansion and is explained in more detail in the FEIS Chapter 3, Topic 8 – Special Designations.

1091. The Wasatch-Cache National Forest should designate additional Research Natural Areas.

1091.1 To gain a better understanding of forest function

1091.2 Temple Fork and Spawn Creek watersheds and Right Hand Fork of the Logan River watershed.

1091.3 Willow Creek Canyon east of Cowley Canyon and the small canyon by the SNC

Response: Portions of Right Hand Fork and Logan Canyons have been identified as Special Interest Areas, rather than Research Natural Areas (RNAs), because some of the recreation and livestock grazing uses in these areas are incompatible with characteristics typically associated with RNAs. These areas do, however, provide many of the same research opportunities because of the near-pristine conditions and the high number of rare plant species in the area. Most of the areas mentioned do not meet the basic objectives for RNA establishment outlined in the Forest Service Manual 4060:

4063.02 - Objectives. The objectives of establishing research natural areas are to:

1. Preserve a wide spectrum of pristine representative areas that typify important forest, shrubland, grassland, alpine, aquatic, geological, and similar natural situations that have special or unique characteristics of scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity.
2. Preserve and maintain genetic diversity.
3. Protect against serious environmental disruptions.
4. Serve as reference areas for the study of succession.
5. Provide onsite and extension educational activities.
6. Serve as baseline areas for measuring long-term ecological changes.
7. Serve as control areas for comparing results from manipulative research.
8. Monitor effects of resource management techniques and practices.

1092. The Wasatch-Cache National Forest should use the Red Butte Research Natural Area to study Properly Functioning Condition and Range of Natural Variability.

Response: The upper portion of the existing Red Butte RNA has been and continues to be a focus of much research because of its relatively undisturbed nature. The lower portion, because of its relatively high amount of introduced species is proposed as a Special Interest Area and will emphasize restoration ecology research and environmental education.

1093. The Wasatch-Cache National Forest should not open the Red Butte Canyon Research Natural Area to tourism.

Response: While we propose to change the designation in the lower portion of Red Butte Canyon to that of a Special Interest Area (SIA), research will remain the highest purpose for this area. Because conditions in this portion of the RNA are less than natural, it was felt that this area could more appropriately be used for restoration ecology research. We also feel that existing trails in the area should be maintained and that environmental education should be an additional focus of this SIA.

Special Interest Areas

1094. The Wasatch-Cache National Forest should designate a Special Interest Area in Logan Canyon to protect endemic cliff plants.
Response: An SIA is proposed in this area for this purpose as well as to focus on environmental education and protection of reference ecosystems.

1095. The Wasatch-Cache National Forest should designate the lower part of the Red Butte Research Natural Area as a Special Interest Area to allow for restoration and education below the dam.
Response: See response 1093.

Special Areas

1096. The Wasatch-Cache National Forest should manage lands as Special Areas to prevent impacts that will be harder to reverse.
Response: Special Areas, Special Interest Areas, and Research Natural Areas are identified in areas where historic management and impacts from various activities have not had significant impacts. These designations are applied to maintain these relatively low disturbance conditions.

1097. The Wasatch-Cache National Forest should consider forming additional Special Areas for botanical, geological, or archeological interests.
Response: While we have not identified additional Special Areas, we have identified new potential Special Interest Areas, which are noted in Chapter 3, Topic 8 – Special Designations, of the FEIS. These areas were primarily focusing on biological/botanical purposes. Other geologic or archaeological areas, while not identified at this time, can be added through future amendments.

Wild and Scenic Rivers

1098. The Wasatch-Cache National Forest should involve the public in making wild, scenic, and recreational designations.
Response: In the future we need to do a suitability study on the rivers that were found to be eligible in 1999 for the National Wild and Scenic Rivers System (NWSRS). At that time the public will be given opportunities for input into the study process. However, the Wasatch-Cache does not designate these rivers in the NWSRS, that is the responsibility of Congress, which, of course, can be influenced by public sentiments and opinions.

1099. The Wasatch-Cache National Forest should provide interim protection for eligible Wild and Scenic Rivers, by ensuring proposed activities are compatible with protection and designation.
Response: Protection for rivers that are eligible as Wild and Scenic Rivers is provided in Appendix VIII in the revised Forest Plan, which includes a list of the eligible rivers. Appendix VIII has guidelines for protection of eligible wild, scenic,

or recreational rivers from activities, which might be proposed that, could alter their free-flowing character or outstanding values. Protection is afforded until a suitability study is completed. If found suitable, eligible rivers would continue to be protected. If not found suitable, a river would no longer be eligible, and protection could not be provided under the Wild and Scenic Rivers Act. Identified river values and free flowing character could be protected under other authorities.

1100. The Wasatch-Cache National Forest should consider that the description of the Standards for Recreational rivers structures is too broad and allows too many new developments and communities.

Response: The standards used for Wild, Scenic, and Recreational rivers are national standards taken from the Forest Service Handbook, 1909.12 Land and Resource Management Planning, Chapter 8, Wild and Scenic River Evaluation. As such the standards were developed at the national level. We chose to apply these national standards, as they are adequate to protect the existing conditions on the eligible streams to which they are applied.

1101. The Wasatch-Cache National Forest should designate additional Wild and Scenic Rivers.

1101.1 To protect aquatic habitats and their diversity.

1101.2 Multiple rivers (38 rivers were listed in the comment.)

1101.3 Logan River

Response: The Forest Service does not "designate" Wild and Scenic Rivers. Congress usually does this.

We protected aquatic habitats eligible for the NWSRS when they met the criteria established by the federal land management agencies in the State of Utah.

A comment suggested that many additional rivers on the Wasatch-Cache should be examined for eligibility or were eligible for the NWSRS. In order to be included in the inventory, river segments had to meet certain criteria identified in the inventory process. The interdisciplinary team evaluated for eligibility those segments meeting the criteria for inclusion in the many river segments and some additional segments identified by Forest Service personnel and the public during the inventory process, and found eligible only those that met the statewide criteria.

Much of the Logan River is receiving interim protection of its free flowing character and identified values as a recreational river. The standards in Appendix VIII of the revised Forest Plan itemize what that protection entails. The Logan River must go through a suitability analysis to see if maintaining its values and free-flowing condition are the most appropriate use of the river. Designation as a Wild and Scenic River could come after an act of Congress, and is outside the authority of the Forest Service.

1102. The Wasatch-Cache National Forest should not designate additional Wild and Scenic Rivers like Little Bear Creek.

Response: The Forest Service does not designate Wild and Scenic Rivers, but as part of the inventory process, can find rivers eligible and afford them interim protection until suitability is determined or Congress acts to designate the river. The Wasatch-Cache has field checked Little Bear Creek, and agrees with a comment which provided information contending that 1) the stream should neither have been classified as "wild" because of the presence of a motorized trail nor 2) were Bonneville cutthroat trout metapopulations present in the stream more than a mile above its confluence with the Logan River. For these reasons Little Bear Creek's classification has changed to Scenic, and the length of the eligible segment length has changed from 4.5 miles to about 1 mile.

1103. The Wasatch-Cache National Forest should ensure that operational patterns for Trial, Lost, and Washington Lakes are consistent with a "Recreational" designation.

Response: The concern suggests that a Recreational classification of a river below a dam may not be appropriate, as water flow regulation by a dam above the river segment (in this case the Upper Provo River) could affect the stream's eligibility. The commenter had good insight in suggesting that flow regulation below a dam might affect eligibility, but the characteristic of the river in relation to the question is not its classification (i.e. Recreational, Scenic, or Wild), but whether its free-flowing character, and hence its eligibility, below the dam is precluded by the dam's potential to modify free-flow.

Congress and the Secretary of the Interior have designated many river segments that are above or below dams. Section 16 of the Wild and Scenic Rivers Act defines a "river" as "a body of water . . . or portion, section, or tributary thereof. . . ". "Free-flowing" is defined as "existing or flowing in natural condition without impoundment. . . " Therefore, any section of river with flowing water meets the technical definition of free-flowing, even if impounded upstream.

Topic 9: Oil and Gas Leasing

Oil and Gas Leasing General

1104. The Wasatch-Cache National Forest should indicate where oil and gas exploration and development are to be allowed.

Response: Management prescription 8 was mapped only for existing oil and gas areas of development (fields not single wells), not for areas of future exploration. Chapter 1 of the EIS discusses the fact that only the area of high potential for which there is no leasing decision is being addressed in the Forest plan revision. In Chapter 3, Topic 9 in the EIS further defined the leasing analysis completed and the area to be analyzed at this time. Leasing opportunities for each alternative are best represented in the set of 11 X 19 inch maps that was included in the map package. These maps showed the leasing stipulations to be applied. Management direction

for future leasing exploration and development has been clarified in the Final Revised Plan. One part of the plan's management direction are maps associated with the Western and Eastern Management Areas that show where future leasing is allowed and under what conditions.

1105. The Forest Service should develop detailed standards for managing minerals, oil, and gas exploration/extraction to protect wildlife, water quality, and other surface resources.
Response: Oil and gas exploration and development is a staged decision making process. Determining availability and lease stipulations is the first step. The next step is when a specific application to drill is submitted for a specific location on the ground. It is at this step that specific conditions of approval and resource protection mitigation and monitoring requirements are applied.

1106. The Wasatch-Cache National Forest should immediately begin to inspect oil and gas development sites to determine potential effects on surface and ground water.
Response: Annual inspection by Forest and Bureau of Land Management personnel is required. In addition the minerals administrator on the Mountain View Ranger District inspects sites frequently to assure compliance with requirements and regulations.

1107. The Wasatch-Cache National Forest should ensure that oil and gas exploration sites are restored by making restoration a condition of the lease.
Response: As explained in Chapter 3, Topic 9 and in Appendix G in the FEIS, oil and gas development is a staged decision process. As such, restoration of the site is addressed at the Application for Permit to Drill stage in the Surface Use Plan. Bonds are a requirement of development and are not released until oil companies have complied with all the requirements of reclamation. Not all sites are required to be restored to pre-development condition. Sometimes the decision is made to leave the roads in place for recreation access and use the well pads as trailheads sites.

Adequacy of Analysis

1108. The Wasatch-Cache National Forest should address oil and gas potential.
1108. By providing analyses and maps showing oil/gas potential
1108. By providing maps and text references on the Appeal Settlement Zone
1108. By using more recent data on oil and gas resource potential
Response: We have expanded the discussion on oil and gas potential to include more recent information including the 1995 USGS National Assessment of Oil and Gas Resources. References to maps and information in this assessment can be retrieved from the USGS website and is referenced in the FEIS.

1109. The Draft EIS should provide further rationale for identification of a field in the area of North Flank Fault.

Response: Directional drilling has been completed by Union Pacific on their land in Summit County and has proven successful for them. There are many factors contributing to whether or not directional drilling can be used successfully on national forest terrain within the appeal settlement zone. However, because each situation is unique and must be evaluated and judged on its own merits, we think it's reasonable to assume that no surface occupancy makes oil exploration and development more difficult for industry.

After an exploratory well is drilled and successful, confirmation wells are needed to confirm the discovery and identify a field. Development of a field would then be proposed and analyzed. Each stage requires new analysis with public involvement. Each analysis would address consistency with the revised forest plan management direction including stipulations.

The scope of the decision to be addressed in the revised forest plan was the area of high potential for which there is no leasing decision, referred to as the Appeal Settlement Zone. As explained in the cumulative effects section in the EIS, additional development in the Uinta Mountains outside the Appeal Settlement Zone is predicted and documented in the 1994 North Slope Oil and Gas Leasing Final Environmental Impact Statement.

1110. The Wasatch-Cache National Forest should analyze the impacts of allocating land to oil and gas development to comply with the National Environmental Policy Act.

Response: We agree that by determining the availability of an area to leasing is an allocation decision and that there is potential to change an area from its current condition. However, while that does not mean every acre of every lease is going to be developed, there is still the potential. Because of the many variables involved with the petroleum industry's decision to move forward, we have to portray effects based on some prediction of what seems to be a reasonably foreseeable development picture. That is why the leasing decision was a critical aspect of each alternative. The range of alternatives analyzes different levels of development.

1111. The Wasatch-Cache National Forest should reexamine the financial risk of additional leasing in the Draft EIS to determine if the oil and gas industry will be at risk if leasing is not allowed.

Response: You are correct. The statement in the EIS reflected the situation with the current block of leases known at the Table Top unit. No, the entire oil and gas industry is not at risk if leasing is allowed. We have edited Topic 9 to be clearer on this point.

Allow Leasing

1112. The Wasatch-Cache National Forest should allow oil and gas leasing in the Table Top Unit.

Response: Leasing is allowed in Alternatives 2, 3, 5, 6, and 7. In all alternatives existing leases are honored and their development is recognized in the effects disclosure. The range of alternatives addressed leasing scenarios that were very restrictive to the petroleum industry to those that allowed great opportunity for development. Alternative 7 tries to strike a balance in protecting some areas for future wilderness designation while allowing oil and gas development. Our reasoning to not issue leases after current ones expire is to not encumber future wilderness with outstanding rights.

Do Not Allow/Restrict Leasing

1113. The Wasatch-Cache National Forest should allow no oil and gas leasing in roadless areas.

1113.1 To protect unique and vital habitat
1113.2 To preserve roadless characteristics and values
1113.3 In the Uintas
1113.4 In the Appeal Settlement Zone
1113.5 On the North Flank Fault
1113.6 On the North Slope

Response: Alternative 1 which does not allow leasing within the Appeal Settlement Zone is most responsive to your concern. In Alternative 1 the ecosystem remains intact and unique habitat and roadless values are preserved. All the alternatives incorporate the 1994 Leasing decision for the North Slope of the Uinta Mountains, which does allow leasing on about 148,000 acres.

Topic 10: Fire Management

Fire Management General

1114. The Wasatch-Cache National Forest should include the importance of fire in its new fire management plans

Response: Thank you for your comment.

1115. The Wasatch-Cache National Forest should evaluate the feasibility of fire management in non-motorized, roadless, and wilderness areas

1115.1 To protect habitat

Response: We recognize that there may be increased costs to suppress fires in roadless or wilderness areas. We believe these costs will be far off set as some fires are allowed to burn in these backcountry areas with minimal staffing. It is important to realize that wildland fires that are allowed to burn are still managed within identified prescriptions or conditions to prevent major impacts to fish, birds, animal, soil and watershed resources.

See also the Fire Management direction in the Forest Service Manual and the Desired Future Condition, Forest-wide goals, subgoals, standards and guidelines of the Forest Plan. Fire management direction is also found in the Wasatch-Cache and Uinta Forests' Fire Management Plan.

1115.2 To manage small roadless areas
Response: Prescribed and wildland fires can be smaller than 5,000 acres in size and prescriptions can be set up for these smaller areas. If fire burn outside of their prescription the fire is reclassified as a wild fire and is suppressed. In areas where wild fires are not allowed and no thinning or timber harvest can take place there are a number of other treatments that can be used to change vegetation into an earlier successional stage and may include some type of mechanical treatment. We also recognize the fact that not all areas can or should be treated at once. In some cases areas may never be treated. Vegetation succession then continues on to a later stage of succession until a natural event alters this condition be it fire or a bug infestation for example. The vegetation is then changed to an earlier stage of succession.

1115.3 To meet desired landscape goals
Response: Thank you for your comment. See response to 1115.1

1115.4 To protect watersheds
Response: We recognize the need to be careful the municipal watersheds on the forest. Mechanical treatments can include the use of animals, equipment and/or people with hand tools. See also response to 1115.1

1116. The Wasatch-Cache National Forest should develop a new fire plan for remote roadless and wilderness areas.
Response: Thank you for your comment. We are trying to make significant changes in this area with wildland fire use plans. You will notice in the FEIS that most prescriptions allow for wildland fire use. Additional direction for this area is in the Wasatch-Cache and Uinta National Forests' Fire Management Plan.

1117. The Wasatch-Cache National Forest should coordinate vegetation information with prescribed fire objectives to evaluate how threatened and endangered plant species respond to fire.
Response: See the Fire Management direction in the Implementation direction of the Forest Plan. A person trained in botany or plant ecology is part of the expertise required for biological evaluations.

1118. The Wasatch-Cache National Forest should replace the word "historic" with "natural" in the desired condition for fire management because of historic fire suppression efforts.
Response: Thank you for your comment. Historical refers to the last 500 years. This has been added to the sentence.

1119. The Wasatch-Cache National Forest should be forthright in stating its objectives in priority treatments.
Response: Thank you for your comment. The intent is to restore aspen communities. Timber harvest may be one tool to accomplish this in an economical manner.

Adequacy of Analysis

1120. The Wasatch-Cache National Forest should explain what it means to "take timely actions to restore proper functioning of ecosystem after wildfire."
Response: This refers to the process of assigning an interdisciplinary team (soil scientist, hydrologist, ecologist) to evaluate the situation immediately and make recommendations on actions such as erosion control and seeding to prevent loss of soil productivity, sedimentation of streams, and invasions of noxious weeds.

1121. The Wasatch-Cache National Forest should correct contradictory statements regarding fire suppression and insect activity levels
Response: The first statement refers to the potential for extensive insect caused mortality, while the second statement refers to the current state of mountain pine beetle activity. The existing forests are comprised primarily of older age classes of trees growing at high densities, conditions that predispose them to widespread insect caused mortality. Currently mountain pine beetle activity is at endemic levels, with pockets of insect mortality occurring in several locations, but not covering extensive areas of the landscape. However, the stand conditions that facilitate the spread of the insects and favor increasing insect populations still exist. If insect populations were to increase rapidly in response to environmental factors such as drought, the existing stand conditions increase the potential for the outbreak to reach epidemic levels, similar to what occurred on the North Slope in the early 1980s.

Legal Considerations

1122. The Wasatch-Cache National Forest should support exceptions to the Clean Air Act to restore forests to healthy conditions
Response: Thank you for your comment. We recognize that this will be a challenge and some exceptions are made, within the Act, to carry out these types of activities.

Education

1123. The Wasatch-Cache National Forest should educate the public and property owners about what they can do to protect their property from fire in order to accomplish fuel reduction.
Response: Thank you for your comment. This is currently being started.

Fuels Management

Fuel Treatments

1124. The Wasatch-Cache National Forest should create a long-term strategy for prescribed fires, wildland fire use, and mechanical treatments to alleviate threatened and endangered species concerns.
Response: See the objectives for vegetation management and urban interface fuels management. This would be part of the plan to be developed.

1125. The Wasatch-Cache National Forest should carefully plan the prescribed sagebrush treatments to benefit sage grouse.
Response: This will be taken into consideration when treatments are done in sagebrush. We have a copy of the document and will be incorporation the appropriate information in site-specific NEPA documents for the treatments.

1126. The Wasatch-Cache National Forest should more fully utilize timber harvest and grazing in conjunction with prescribed burns
1126.1 To avoid wasting resources
Response: Thanks for your comment.

1126.2 To maintain a healthy forest
Response: We recognize that wild fires need to be suppressed. This is addressed in the Wasatch-Cache and Uinta National Forests' Fire Management Plan. We also recognize the role fire plays in the ecosystems and that we will be unable to either harvest or graze sufficient areas of land large enough to maintain healthy ecosystems through the use of these two tools alone.

1126.3 To avert fire risk
Response: Thanks for your comment. See response to response 1126.2. See also the Forest Wild Activities and Project Outputs for timber and range livestock outputs. We also believe that prescribe fire is a valuable tool to be used in restoring healthy ecosystems.

1126.4 To bring the forest back into historic range of variability
Response: Thank you for your comment. We recognize the need for public information and maintaining prescribed fires, especially in urban interface zones, within prescription. See the objective for urban interface fuels management in the Plan.

1126.5 To maintain the viability of local economies
Response: We recognize the opportunity that exists to provide forest products and the benefits that comes to local communities. However, our primary responsibility is to provide for the sustainability of the land. A greater discussion can be found in the plan under ecosystem management framework and the forest plan model and the Forest Service Natural Resouce Agenda for the 21st Century. It's important to

recognize that not all National Forest lands on the Wasatch-Cache National Forest are available for timber harvest. Based on information presented in Table 3, under land classification, of the Forest Plan, only 2.5% is identified as totally suitable forest lands for timber harvest. This is not to say that timber harvest cannot occur in other prescriptions than those identified as Management Prescriptions 5.2/6.2. It is recognized that timber harvest may occur on lands not mapped with prescription categories 5-2/6-2. The objectives in these other prescriptions are not timber production See FEIS Table TM-2. This increased the acres available for timber harvest is 202,000 acres or 16% of the forest. Harvest from this area is identified and accounted for in the plan. Also see the discussion for response to Issue 4 in the Forest Plan.

1127. The Wasatch-Cache National Forest should utilize prescribed burns or selected removal of fuels instead of full harvesting to better mimic natural processes.
Response: Thank you for your comment. See Revision Topic 7 suitable timberlands.

1128. The Wasatch-Cache National Forest should reevaluate timber harvesting and mechanical treatments as means to meet forest goals
1128.1 Because of their inability to restore fire-adapted ecosystems
Response: The Revised Forest Plan developed from the selected FEIS Alternative 7 provides for a combination of approaches to restore fire-adapted ecosystems. These include timber harvest, mechanical treatments, prescribed fire and wildland fire use. The treatment applied to a particular stand will depend upon a site-specific analysis that incorporates management objectives, potential outputs and consideration of other resources. The majority of acres to be treated are with prescribed fire except in the wildland urban interface where human safety and needs for protecting structures such as homes require a mechanical treatment approach.

1128.2 Because of the role of standing dead timber in forest wild fires
Response: The Revised Forest Plan provides direction in the form of standards and guidelines to ensure that the functions of standing dead timber continue to be provided for after any kind of timber harvest or mechanical treatment.

1128.3 Because mature trees are needed for wildlife habitat
Response: The Revised Forest Plan provides direction in the form of standards and guidelines to ensure that the functions of mature trees for wildlife continue to be provided for after any kind of timber harvest or mechanical treatment.

1128.4 Because young trees have high fuel load values
Response: See response 1128.1.

1128.5 Because timber harvesting cannot replace the role of fire in the forest
Response: See response 1128.1.

1128.6 Because harvested areas show a strong association with increased rate of spread and flame length
Response: See response 1128.1.

Prescribed Burns

1129. The Wasatch-Cache National Forest should not rely on prescribed burns for fire management
1129.1 Because they do not prevent high-severity fires
Response: Thanks for your comment.

1129.2 Because they are not adequate to meet forest goals
Response: After reevaluating these projects the number of acres identified over a 10 year period have been dropped to 37,000 or 3,700 per year. See table 2-2 in the FEIS. prescribed fire

1130. The Wasatch-Cache National Forest should utilize prescribed burns to maintain bio-integrity
Response: Thank you for your comment.

Fire Suppression

1131. The Wasatch-Cache National Forest should view burned areas as a natural process and allow fires to burn within Historic Range of Variability.
Response: Fire and its affects are recognized as a natural process although the casual visitor may not see it as an esthetic or scenic character on the landscape. Wildland fire use is managed within prescriptions as identified by a fire management plan. These site specific plans identify when and where such use is appropriate. To define it in the Plan is premature.See the discussion in the analysis in the FEIS on the effects on scenic resources from fire, insects and disease.

1132. The Wasatch-Cache National Forest should not make fire suppression the default course of action for areas not having a fire management plan.
Response: Wildland fire use requires pre-stated resource management objectives over predefined geographic areas. To allow a fire to burn without such objectives and a defined area would be inappropriate and not keeping with national direction.

Heritage Resources

1133. The Wasatch-Cache National Forest should modify current land management practices to protect western culture and heritage.
Response: The Revised Forest Plan includes goals and standards and guidelines that address protection of heritage resources.

Locatable and Salable Minerals

Locatable and Salable Minerals General

1134. The Wasatch-Cache National Forest should include discussions on recreational fossil collecting in the Forest Plan.
Response: Recreational fossil collecting is briefly discussed in the Paleontology portion of the Locatable and Salable Minerals section of the EIS. While there are occurrences of some kinds of fossils in some areas that may attract recreational collecting interest, compared with other recreational activities, this use is rather limited and it has not by itself specifically been identified as a revision topic. Recreational fossil collecting is one of many recreational pursuits which are addressed through the management direction for recreation and access. As noted in the EIS, casual collecting of invertebrate fossils does not require any special authorization.

1135. The Wasatch-Cache National Forest should add objectives for mineral and energy exploration and development to create better geologic maps, make inventories of the paleontological or mineral and energy resources, and regularly reassess the existing information on these geologic resources.
Response: Our objectives focus our efforts on areas where the need to correct resource conditions or meet user demands are greatest.

The TERRA component of the NRIS database (the Forest Service's National Resource Information System) is gathering basic geologic data and will eventually be integrated into GIS layers amenable to display with other GIS layers. That will be updated, as geologic data are available.

The Wasatch-Cache experiences limited demand from mining claimants and few locatable mineral proposals. Commercial sources of salable material are available off-forest and sources on the forest are not in demand. Because of these factors we do not see a need for inventories of mineral resources. Where the petroleum industry has expressed interest in leasable minerals (primarily oil and gas), we have addressed that in Topic 9.

1136. The Wasatch-Cache National Forest should add a discussion of the management direction for geologic, paleontologic, and mineral resources to the Forest Plan including a discussion of where energy and mineral development activites are, and are not, allowed under the proposed plan.
Response: We have included management direction for these resources where we view a there is a need. In many cases current policy and existing law provides adequate direction. In the case of locatable minerals, management will be consistent with the 1872 Mining law, as amended which governs the disposal of those minerals. We also believe no additional direction is required because of the existing law and regulation for salable minerals under the Materials Act of 1947, as

amended. Management direction for paleontologic resources is found in Forest Service Manual 2680.3, which we believe is appropriate level needed.

In the absence of broad public interest or interest from the scientific community, we have generally chosen not to provide management direction regarding management of geologic resources. We have added specific direction for cave management in the forestwide standards and guidelines. In the future if a significant need is expressed relative to a particular resource, we will address that through Forest Plan amendments.

We have included management direction for oil and gas resources. For the areas of high potential for petroleum reserves on the Forest, we have added direction about leasing compatibility.

1137. The Wasatch-Cache National Forest should combine the discussions on geological, mineral, and paleontological resources into a single topic in the Final EIS.
Response: While there is no right or wrong way to organize subject areas, we chose to organize our EIS by Planning Topic.

1138. The Wasatch-Cache National Forest should include maps depicting all currently active quarries/sand and gravel pits in the Final EIS.
Response: All of the quarries sand and gravel pits on the Forest are used for internal Forest Service purposes only. There are no commercial operations. As such, we do not believe a map such as you one you request is necessary. Since commercial sources of salable material are available off-forest, there has not been a demand expressed by private operators. Should this situation change significantly, we'll address the need at that time.

Adequacy of Analysis

1139. The Final EIS should include a discussion of the effects of oil pits on wildlife mortality.
Response: See Response 362.

1140. The Wasatch-Cache National Forest should clarify whether acreage figures cited in the effects of oil and gas leasing on wildlife section are due to direct or indirect effects.
Response: They are direct effects. This has been clarified in the text.

Mineral Extraction

1141. The Wasatch-Cache National Forest should restore areas with mining damage.
141.1 To protect watershed health
141.2 To restore the scenic value of Little Cottonwood Canyon

Response: Since the mid-1980's, the Forest has been an active partner with the Utah Division of Oil Gas and Mining in inventorying and closing mine openings deemed to present an immediate hazard to the public. An ancillary effect of that is to restore a measure of scenic value in the canyons. It is important to note restoration of mines located on private lands is outside of Forest Service authority.

We agree that there are some harmful remaining effects to water quality from the mining in the 1800's. Since 1998, the Forest has been a participant in the Little Cottonwood Group. This group is assessing the effect of mining on Little Cottonwood Creek by collecting field data on water quality, stream morphology and aquatic health. An assessment is being reviewed by the Environmental Protection Agency.

1142. The Wasatch-Cache National Forest should continue to allow recreational mining because it is not harmful.

Response: As explained in the EIS, there are three stream segments open to recreational dredging, sluicing and panning under a cooperative USFS/BLNM/State permit. This use will continue in the revised forest plan. Other mining related activity is allowed on lands open to operations under the 1872 Mining Law, whether it be 'recreational' or not. We will manage those activities under Forest Service mining regulations when disturbance is significant.

Social and Economic Analysis

Social and Economic Analysis General

1143. The Wasatch-Cache National Forest should prepare an adequate socioeconomic analysis.

1143.1 By including costs associated with different management activities in the social economic assessment.

Response: The economic analysis of alternatives was completed according to federal regulations and Forest Service requirements. The FEIS includes economic analyses from both a regional and a national accounting stance. The regional accounting stance is used for social and economic impact analysis to local communities and counties. This includes changes to employment and labor income. The national accounting stance is used for the consideration of benefits and coats to all of society. The economic PNV analysis includes market prices for timber, range, and mineral outputs and non-market price estimates for outdoor recreation. This analysis is explained in the social and economic analysis in chapter 4 of the FEIS and in further detail in Appendix B.

Aside from the economic analysis, regional and national issues, values, and concerns were considered throughout the planning process. Comments from all interested people were used to develop alternatives and issues. Economic modeling considers impacts to local communities, but use of forest resources includes use from locals and visitors.

1143.2 By including an analysis of the receipts and expenditures of the Fee Demo program in the social economic assessment.
Response: The Fee Demo program, while enjoying some success both locally and nationally is not a decision that is made in the forest plan, and consequently not a required or appropriate disclosure in forest planning. Periodic reports on Fee Demo receipts are developed internally, and these and programs are available from the Wasatch-Cache if requested.

1143.3 By analyzing the social and economic impacts on all forest users, not just local communities.
Response: See response 1143.1.

1143.4 By including the results of the Utah State University study "An Economic and Social Assessment of Snowmobiling in Utah"
Response: Thank you for your comment, while the draft report had been used in the DEIS analysis, and the final report has been used in FEIS economic analysis.

Social Values

Population Growth

1144. The Wasatch-Cache National Forest should factor projected population growth into management plans.
1144.1 By identifying the combined impacts of all users instead of viewing them separately.
1144.2 By acknowledging that population growth will result in restrictions on traditional experiences.
Responses: The Forest Service alone cannot control growth. The Forest Service, state and local governments, non-profits organizations, businesses, and individuals all share the burden of planning for the future together. Even then, market forces, international events, and demographic pressures in and outside of the analysis area are beyond the control of any and all parties.

Growth of the Wasatch Front was identified and considered within the social and economic section of the FEIS, recreational growth and trends in use on the forest are presented in the recreation section of the FEIS. Cumulative effects of alternatives are presented in all resource sections and consider larger use trends surrounding the Forest.

Development

1145. The Wasatch-Cache National Forest should not have a goal to "encourage private enterprise to develop recreational facilities on and off the forest", because this land belongs to the public.
Response: Given increasingly higher demands for outdoor recreation, and the associated high cost of responding to these demands, federal funding alone is not

sufficient to sustain resource values while continuing to meet a good part of that demand in a responsible manner. Reducing costs to the American taxpayer and stimulating responsible local governments and the private sector has been, and will continue to be a national strategy for dealing with the issues of high recreation user demand, high costs, and concern for the continuity of forest settings.

1146. The Wasatch-Cache National Forest should allow extensive commercial development on the Park City side of the range, and little or no additional commercial development of the Wasatch Front and its canyons.
Response: In Alternative 3 some additional area for expansion of ski areas is provided on the east slopes of the Salt Lake District. This alternative also allows for some expansion of ski areas in canyons on the Wasatch Front side. Other alternatives do not allow for additional ski area expansions.

1147. The Wasatch-Cache National Forest should prohibit development for environmental reasons.
1147.1 To protect wildlife habitat and winter range
1147.2 To protect watersheds
Responses: In all alternatives wildlife habitat, winter range, and watershed protection are protected to varying degrees. The acreage available for development is minor in any alternative compared to what is protected, and certainly proposals for development would only apply to a very small percentage of lands. Any project planning would consider a range of mitigation treatments in alternatives where proposals for development are possible.

1148. The Wasatch-Cache National Forest should prohibit development for social reasons.
1148.1 To preserve wilderness characteristics that provide an escape from an urban environment
1148.2 To preserve natural environments for the future
1148.3 To avoid bringing more users into the forests
1148.4 Until a carrying capacity study has been conducted
Responses: A broad range of on-forest social settings are arrayed across the forest through the alternatives presented in the FEIS. Wasatch-Cache forest leadership recognizes the concerns of many in our population who feel that additional recreation use and impacts cannot be sustained.

1149. The Wasatch-Cache National Forest should prohibit development in certain areas.
1149.1 In roadless areas
1149.2 In the canyons
1149.3 In the Tri-Canyon area
1149.4 In Taylor Canyon and Wheeler Creek
1149.5 On the west side of Mount Ogden
Responses: The range of alternatives presented in the FEIS provide management prescriptions which either allow or do not allow a range of recreation development,

vegetation treatments, and trail and road building on the forest. A range of possible development or protection prescriptions are applied to each of these areas.

1150. The Wasatch-Cache National Forest should prohibit commercial or amusement type development in the canyons because these services can be provided by cities within close proximity.

Response: The Forest Service recognizes that some activities and developments are more appropriately and traditionally provided for on private lands than on National Forests. National, community, and individual values obviously vary on where to draw the line on these questions. Management prescriptions, scenery management, and recreation opportunity spectrum guidelines help frame what is allowable. Specific proposals will be compared to forest plan direction when they are presented, as well as to local site conditions, community needs, potential mitigation, and other manual and handbook direction.

1151. The Wasatch-Cache National Forest should discourage unsightly development.

Response: Scenery Management System (SMS) guidelines presented in Chapter 4 of the revised Forest Plan give direction for project proposals so that desirable developed and natural scenic settings are provided.

Economic Values

Economic Values General

1152. The Wasatch-Cache National Forest should give economic considerations the lowest possible priority.

Response: Economics is one of the many criteria considered in the decision making process. The level of importance economic values plays will depend upon issues and concerns of the public and the information desired by the decision maker.

1153. The Wasatch-Cache National Forest should not preserve wild country for the short-term desires of a few.

Response: Forest Plans are a balance between the many competing uses of national resources. The alternative selected will be a mix of preservation and resource uses with both short term and long term goals for resource conditions.

Adequacy of Analysis

1154. The Wasatch-Cache National Forest should strengthen its economic analysis.

1154.1 By separating different industries and communities

1154.2 By using more recent data

1154.3 By disclosing the real socio-economic impacts of the various alternatives

1154.4 By including information about the economic benefits of healthy forests

1154.5 By analyzing the economic benefits to local communities from motorized recreation
1154.6 By providing documentation to support its claim that backcountry areas are less expensive and more economically efficient to manage than designated wilderness
1154.7 By using the travel cost method and contingent valuation method to show a similarity of possible economic and social valuations associated with preserving the Wasatch-Cache mountain ecosystem
1154.8 By including information about externalized costs passed on to communities, businesses, and individuals when national forests are developed
Response: Improvements have been made to the social and economic analysis in the FEIS to show individual industries and update to the most recent data available. It is difficult to always portray the economic data desired due to limited data sources and non-disclosure laws. There is generally a two-year lag with economic data between when it was collected and released for use. In terms of recreation use and expenditure data, it is often non-existent, available only at large scales (state-wide), or based on assumptions that do not match with Forest Service management or priorities.

Often an individual feels the greatest impact of an alternative or change in Forest Service management and such impacts are difficult to summarize at the large scale of a Forest Plan. The FEIS has been edited to show greater sensitivity between alternatives, but in many cases, there may be little difference. It is important to review the resource sections of the FEIS for more resource specific information concerning each area and alternative as well as the social and economic analysis.

The value of healthy forests can be found in summary tables of anticipated, measurable outcomes and activities by alternative in Chapter 2. Detailed discussions of each outcome can be found in the corresponding sections of Chapter 3 and 4. A balancing of all economic and non-economic outputs is best found in the Record of Decision. In that document, the Regional Forester discloses his consideration of outputs and outcomes that are monetarily valued (in the economic efficiency analysis) with others that do not have or cannot be monetarily valued.

With regard to 1154.6, the commenter inferred that the Forest Service had suggested that Wilderness management was more expensive than backcountry management for the Lakes roadless area, and that the Forest Service has an unfounded bias against Wilderness, that can in part be shown through unfounded perceptions that Wilderness management is comparatively expensive. We have reread of this section of the Need section of Appendix C (DEIS) or C-1 (FEIS) for Lakes. The statement does not unequivocally state that managing backcountry is cheaper than managing Wilderness. What the sentence states is, “This type of management” (meaning backcountry, not Wilderness) “could allow for more cost effective mitigation of human impacts…” The intent of the statement was not to assert a hard fact derived from an analysis of the cost differences of wilderness vs backcountry management, rather a simple suggestion that this might be the case.

Cost of management is not a compelling factor choosing between alternatives in this forest plan revision. The economic analysis of alternatives does keep constant budgets as an assumption across all alternatives.

The travel-cost method is one method to gather recreation expenditure data; the economic analysis used information readily available through Forest Service research to estimate recreation and tourism impacts to local communities. This analysis included motorized use, both OHV and snowmachines. For more information, see appendix B-11.

Externalities are not required to be included in the economic analysis: 36 CFR 219.12(g)3(i) directs that costs "of the agency and all other public and private costs required to manage the forest up to the point where the outputs are valued and the environmental consequences are realized" be included in the estimated effects of alternatives (emphasis added). Agency costs have been include in the FEIS Financial and Economic Efficiency analysis. Where there are significant private costs necessary to provide the valued outputs, they have been estimated and explicitly included in the efficiency analysis.

1155. The Wasatch-Cache National Forest should strengthen its cost/benefits analysis.

1155.1 By providing a full accounting of benefits and costs, including "nonuse" benefits

1155.2 By comparing the management of roadless areas as wilderness versus the proposed management

Response: The Implementing regulations of NEPA expressly avoids a cost-benefit analysis as being a necessary basis for decisions: 'For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations.' (40 CFR 1502.23) A cost-benefit analysis, however, may be conducted if desired or required by other laws, regulations, or directives. Economic impacts, however, are a concern of NEPA, but only where such issues have been identified during scoping. The economic section of the FEIS includes PNV and distribution analyses as required.

Non-use benefits: Summary tables of anticipated, measurable outcomes and activities by alternative can be found in Chapter 2. Detailed discussions of each outcome can be found in the corresponding sections of Chapter 3 and 4. A balancing of all economic and non-economic outputs is best found in the Record of Decision. In that document, the Regional Forester discloses his consideration of outputs and outcomes that are monetarily valued (in the economic efficiency analysis) with others that do not have or cannot be monetarily valued.

Even Wilderness areas require budget for management, and none of the alternatives designate the entire Forest or all roadless areas as Wilderness so a budget will still be needed outside of Wilderness for management and forest stewardship projects.

1156. The Wasatch-Cache National Forest should provide an accounting of costs associated with various activities.

1156.1 Timber harvest

1156.2 Grazing

Response: The costs and benefits of resource uses of the national forest are highlighted in the FEIS in resource sections as well as within the social and economic section.

1157. The Wasatch-Cache National Forest should revise or eliminate the net public benefits discussion.

1157.1 Because the 50-year time frame is meaningless

1157.2 Because it is based on faulty assumptions

Response: A PNV analysis is required by the National Forest Management Act (36 CFR 219) the FEIS analysis has been clarified.

1158. The Wasatch-Cache National Forest should establish accurate benchmarks for the net public benefits analysis.

Response: Benchmarks required by 39 CFR 219.12 (e) (1) were determined during the development of the 1985 Forest Plan, and were specified in the Chapter II, sections D, E, and F in the FEIS of November 2, 1984, and are summarized in the Preliminary Analysis of the Management Situation (April 1999). Our analysis in this forest plan revision has not recalculated those original benchmarks in revising the forest plan. Benchmarks, being minimum level of forest management to maintain the Forest and maximum production potential of significant goods and services (including associated monetary estimates of values) within which alternatives must be constructed are extremes. These extreme output levels are not approached or exceeded in the alternatives analyzed in the FEIS.

1159. The Wasatch-Cache National Forest should establish an analytical process to demonstrate that the final Forest Plan will maximize net public benefits.

Response: RPA/NFMA and implementing regulations outline the economic analysis and criterion requirement for forest planning, the commenters misunderstand the 'net public benefits' analytical framework prescribed by 36 CFR 219. 'Net public benefits' is not a benefit-cost analysis given a comprehensive economic efficiency framework – one that incorporates a monetary expression of all known market and non-market benefits and costs. Such an analysis is generally used when economic efficiency is the sole or primary criterion upon which a decision is made. The Forest Service does not endorse or expect this use of economic efficiency analysis in projects, programs, or other analyses. The agency recognizes that many of the values associated with natural resource management are best handled apart from, but in conjunction with, a more limited benefit-cost framework. This concept is expressed in NFMA regulations [36 CFR 219] and is referred as 'cost-efficiency.' When discussing the evaluation of Forest Plan alternatives, the regulations state that the evaluation 'shall compare present net value, social and economic impacts, outputs of goods and services, and overall protection and enhancement of environmental resources' [36 CFR 219.12(h)]. It is

this process that results in a Forest Plan that 'maximizes long term net public benefits in a environmentally sound manner' [36 CFR 219.1].

The NFMA regulations define net public benefits as: 'An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index [36 CFR 219.3].'

Such an approach is reasonable given the vast array of environmental, social, and economic considerations in establishing or revising a Forest Plan. It is also consistent with the definition of multiple use as given in the MUSY Act.

The Forest Service Manual and Handbook system agrees with this approach. FSH 1909.17, section 10 calls for economic efficiency analysis for all projects. Section 11 clarifies the analysis required. A pure economic efficiency analysis includes all benefits and cots in monetary, and therefore, maximizing present net value yields the same results as maximizing net public benefits. However, in most planning conditions all benefits and costs cannot be monetarily valued. Under this circumstance, maximizing present net value is not the same as maximizing net public benefits, and the handbook recommends the use of 'cost-efficiency' to satisfy these requirements. FSM 2430 and FSH2409.18 also focus on the concept of 'cost-efficiency' rather than pure economic efficiency.

1160. The Wasatch-Cache National Forest should quantify ecosystem service values and externalized costs of commodity production in the net public benefits analysis.

Response: Externalities are not required to be included in the economic analysis: 36 CFR 219.12(g)3(i) directs that costs "of the agency and all other public and private costs required to manage the forest <u>up to the point where the outputs are valued</u> and the environmental consequences are realized" be included in the estimated effects of alternatives (emphasis added). Agency costs have been include in the FEIS Financial and Economic Efficiency analysis. Where there are significant private costs necessary to provide the valued outputs, they have been estimated and explicitly included in the efficiency analysis.

There are many values associated with National Forests that cannot be expressed in monetary terms. Many values are highly personal and subjective in nature. These values include connections of people, circumstances, time and place that occur on the National Forests. An example may be an annual family trip to a certain scenic vista using their off-highway vehicle on a favorite designated route. Monetary expressions are poor measures for the moment and the reflection of such multi-faceted values. These, however, may be the greatest value of National Forests to the nation.

Other values can and have been expressed in monetary terms in the economics literature. Existence, option, and bequest values are among the kinds of values that have been expressed in monetary terms. Typically, a study is focused on a particular kind of value for a particular geographic location and a specific population. The results are valid for that specific location and population, but may not be transferable to all situations. Thus, a study in the southern Rockies or the Pacific Northwest may not be applicable to the Wasatch-Cache National Forest.

The economics literature clearly shows that people hold passive use values for a variety of conditions on the National Forests. These values are relevant to the management situation on the Wasatch-Cache, but the spectrum of values in the literature is not easily transferred to the programmatic analyses and decisions being made for the Wasatch-Cache. Although the Forest Service recognizes the validity and importance of these values, the existing literature is not sufficient to serve as a basis for monetary estimates of the management actions proposed by the Wasatch-Cache plan. Therefore, passive use values for such things as biological diversity and wildlife habitat must be taken into consideration in a qualitative sense.

Comments on the DEIS have suggested that the full value of the Wasatch-Cache National Forest should be included in any benefit-cost analysis. This value might include such things as ecosystem services, its place in our national heritage, and all capital improvements. This kind of analysis would be appropriate if the decision in a forest plan revision was to retain or eliminate the entire National Forest. The decisions made in a forest plan revision, however, are incremental. The decisions are not whether to keep or sell the Wasatch-Cache National Forest, but rather to make step-wise changes in the way it is managed. Consequently, it is the difference between the 'no action' alternative and the other alternatives that offers insight into the benefits and costs of each course of action.

The values mentioned above are often discussed in the biological, physical, recreational, or cultural sections of the FEIS. Their consideration is also documented in the Record of Decision. Because such values are not expressed in monetary terms and therefore not included in the economic efficiency analysis does not mean that they have been excluded from the calculus of 'net public benefits'. Present net value is determined in part from benefits that can be expressed monetarily, but this is only a portion of all the values associated with the Wasatch-Cache National Forest.

1160.1 Incorporate information from The Economic Case against National Forest Logging

Response: Any policy regarding the subsidization of industries is not within the scope of the forest plan revision. While the Wasatch-Cache National Forest is concerned with effects on jobs in communities as it relates to Forest management, it has no policy to protect jobs in selected industries.

The timber industry is often singled out as receiving favored treatment by the Forest Service. Throughout the last decade, numerous mills in the Intermountain Region have closed while others have reconfigured to process smaller loges. International and national market forces now affect mills in the country more directly than ever before. There is a continuing demand for timber products in this country, and National Forests play an important role in supplying timber to meet the demand. The Wasatch-Cache National Forest historically has not been a large supplier of timber, but provides modest volumes of logs and wood fiber that are processed at local and regional mills in Utah, Idaho and Wyoming.

Timber from the Wasatch-Cache National Forest is sold at market rates. Timber prices fluctuate from year to year, as influenced by market forces. Depending upon conditions, some firms purchase National Forest timber at prices above their production costs while others purchase timber below their production costs. Timber analysis in this FEIS used historic market prices, adjusted annually for projected real price increases.

While the Forest Service in general and this Forest Plan in particular does not subsidize the timber industry with below-market prices, it has a keen interest in maintaining industry viability within the region. A local timber industry provides land managers and taxpayers with cost-effective options for treating vegetation to achieve 1) reduced risk of wildfires and insects and 2) improved forest health.

1161. The Wasatch-Cache National Forest planning documents should incorporate ecosystem service values and externalized costs.
1161.1 In order to comply with the Multiple Use and Sustained Yield (MUSY) Act
1161.2 In order to comply with the National Environmental Policy Act
1161.3 In order to comply with the Forest and Rangeland Renewable Resources Planning Act and the National Forest Management Act (NFMA)
1161.4 In order to comply with the Administrative Procedures Act
1161.5 In order to comply with the Economic and Social Analysis Handbook
1161.6 In order to comply with the Timber Sale Preparation Handbook
1161.7 In order to comply with the Forest Service Manual
Response: MUSY calls for management of the National Forests 'with consideration being given to the relative values of the various resources.' There is no requirement for such values to be monetarily expressed.

RPA/NFMA and implementing regulations outline the economic analysis and criterion requirement for forest planning, the commentors misunderstand the 'net public benefits' analytical framework prescribed by 36 CFR 219. 'Net public benefits' is not a benefit-cost analysis given a comprehensive economic efficiency framework – one that incorporates a monetary expression of all known market and non-market benefits and costs. Such an analysis is generally used when economic efficiency is the sole or primary criterion upon which a decision is made. The Forest Service does not endorse or expect this use of economic efficiency analysis

in projects, programs, or other analyses. The agency recognizes that many of the values associated with natural resource management are best handled apart from, but in conjunction with, a more limited benefit-cost framework. This concept is expressed in NFMA regulations [36 CFR 219] and is referred as 'cost-efficiency.' When discussing the evaluation of Forest Plan alternatives, the regulations state that the evaluation 'shall compare present net value, social and economic impacts, outputs of goods and services, and overall protection and enhancement of environmental resources' [36 CFR 219.12(h)]. It is this process that results in a Forest Plan that 'maximizes long term net public benefits in a environmentally sound manner' [36 CFR 219.1].

The NFMA regulations define net public benefits as: 'An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index [36 CFR 219.3].'

Such an approach is reasonable given the vast array of environmental, social, and economic considerations in establishing or revising a Forest Plan. It is also consistent with the definition of multiple use as given in the MUSY Act.

The FS Manual and Handbook system agrees with this approach. FSH 1909.17, section 10 calls for economic efficiency analysis for all projects. Section 11 clarifies the analysis required. A pure economic efficiency analysis includes all benefits and cots in monetary, and therefore, maximizing present net value yields the same results as maximizing net public benefits. However, in most planning conditions all benefits and costs cannot be monetarily valued. Under this circumstance, maximizing present net value is not the same as maximizing net public benefits, and the handbook recommends the use of 'cost-efficiency' to satisfy these requirements. FSM 2430 and FSH2409.18 also focus on the concept of 'cost-efficiency' rather than pure economic efficiency.

The Implementing regulations of NEPA expressly avoid a cost-benefit analysis as being a necessary basis for decisions: 'For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations.' (40 CFR 1502.23) A cost-benefit analysis, however, may be conducted if desired or required by other laws, regulations, or directives. Economic impacts, however, are a concern of NEPA, but only where such issues have been identified during scoping.

With regard to the Administrative Procedures Act, there have been no violations of law, regulation or procedure, as noted above, and thus the process for this Forest Plan is not arbitrary, capricious, or unreasonable.

1162. The Wasatch-Cache National Forest should resolve the discrepancy in timber employment numbers presented in the Draft EIS.
Response: Thank you for you comment, the FEIS has been edited to ensure employment numbers between sections are consistent, or if reporting different types of employment, that the text clarifies the differences between the sections.

Economic Impacts

1163. The Wasatch-Cache National Forest should address the important economic contribution of various activities.
1163.1 Grazing
1163.2 Recreation and tourism
1163.3 Motorized use
Response: The social and economic section in the FEIS highlights the contribution and potential impacts of each forest resource program. Specific output and resource information is available in specific resource sections of the FEIS.

1164. The Wasatch-Cache National Forest should acknowledge that national forests do not contribute significantly to the agricultural economy.
Response: The social and economic section of the FEIS highlights the contribution and potential impact of the agricultural sector to the analysis area economy.

1165. The Wasatch-Cache National Forest should acknowledge that the value of one particular job is of no greater relative import than another job and that local economies are generally very elastic.
Response: While the Wasatch-Cache National Forest is concerned with effects on jobs in communities as it relates to Forest management, it has no policy to protect jobs in selected industry. The social and economic section of the FEIS highlights the importance of Forest outputs local economies to communities within the analysis area.

Funding

1166. The Wasatch-Cache National Forest should formulate its budget to reflect the fact that recreation is the number one use of the forest.
Response: The recreation section of the FEIS highlights the trends and use on the Wasatch-Cache for recreation and tourism activities. The social and economic section highlights the contribution and potential impacts of this activity on the analysis area economy.

Subsidies

1167. The Wasatch-Cache National Forest should not subsidize commercial industries or development.

Response: "Below-cost" management is not uncommon for national forests (with respect to timber sales, grazing and recreation management) as cost is not the only driver in determining what is appropriate management for an area. Most often, commercial ventures and proposals for the national forest are made because they are profitable for the operators. The Forest Service often makes operators bear the costs of environmental analyses associated with proposals. Commercial activities on national forests are carefully scrutinized in terms of their environmental, social and economic or business consequences.

1168. The Wasatch-Cache National Forest should require user groups to restore the forest to properly functioning condition by requiring industries to pay a bond before issuing any extractive permits.

Response: Permittees and contractors on national forest lands have to meet permit and contract requirements which include a performance bond, and in permits and contracts there are specific clauses for protection from and mitigation of effects to vegetation, soils, chemical use, litter and garbage, etc, associated with their activities. Requiring these groups to recover properly functioning condition (PFC) across broad areas of the forest is not something that has been done. The attainment of PFC (a relatively new concept in land management) is something that will likely take considerable time and integrated management and endeavors of both private user groups (commercial and non-commercial) and federal, state, and local governments.

1169. The Wasatch-Cache National Forest should require lost or injured recreationists to pay for rescue efforts.

Response: While this question is outside the scope of forest plan revision, injured or lost recreationists can be billed if a medical helicopter is used in their rescue. Most often rescue is done by a County or State crew using the equipment necessary to complete the search and evacuation and the Counties bear this expense. The Forest Service does not pay for these rescues, but individual employees can participate in the rescue efforts.

Lands, Real Estate, and Property Boundary Management

Lands, Real Estate, and Property Boundary Management General

1170. The Wasatch-Cache National Forest should modify the Federal land conveyances in the Forest Plan (p. 5–10) by not disposing of parcels with inefficient configurations.

Response: Parcels of federal land with inefficient configurations are often the subject of degradation, trespass, or otherwise negatively affected, as they cannot be managed consistent with the land management goals of a larger block of federal

land. These irregular parcels can be surrounded or influenced by lands under other ownership that are managed for very different intentions.

1171. The Wasatch-Cache National Forest should wage a defense against interest claims it believes to be without merit.
Response: While this comment is generally outside the scope of forest plan decisions, the Forest Service does carefully scrutinize claims that are made regarding agency land so that the public lands are protected against unfounded assertions.

Land Purchases and Exchanges

1172. The Wasatch-Cache National Forest should add the Cache Valley foothills to its acquisition list to prevent further development
Response: Landownership adjustment direction at the forest plan level is usually best stated in general terms across the forest without specifically mentioning individual tracts or areas. While such a disclosure might be desirable disclosure to those interested in knowing how the forest is approaching these ownership problems, detailed specificity often can alarm local landowners, escalate prices/values of lands and create unnecessary problems.

1173. The Wasatch-Cache National Forest should acquire additional private lands.
1173.1 To protect multiple resources
1173.2 To protect moose habitat
1173.3 To preserve watersheds
Response: These three types of settings are generally included in the priority land acquisitions presented in the revised Forest Plan. The ability of the Forest Service to acquire these lands is based on funding, the gravity of the need for acquisition, and other emphases that can affect the completion of a transaction.

1174. The Wasatch-Cache National Forest should eliminate all private inholdings in roadless areas.
Response: Isolated private parcels within roadless areas can create some management difficulty or controversy if landowners need to develop a road into the parcels or otherwise develop the area they own. The Forest Service recognizes the desirability of blocking up ownership. This can often work to the advantage of both the private landowners and the government.

1175. The Wasatch-Cache National Forest should consider additional land exchanges with public input.
Response: The Forest Service is considering more land exchanges and does involve the public through NEPA scoping and process for land exchanges and by complying with the Federal Land Exchange Facilitation Act (1988).

1176. The Wasatch-Cache National Forest should not exchange lands within the Tri-Canyons.

1176.1 That would compromise watershed health and wildlife
1176.2 That would create developable private property
Response: The forest recognizes the sensitivity of public sentiment concerning land development and land values in the Tri-Canyons. The revised Forest Plan identifies priority acquisitions and conveyances in its management direction. Riparian areas, areas valuable to wildlife and for watershed protection are identified as high value for acquisition. Conversely, they would not be easily traded out of public ownership.

1177. The Wasatch-Cache National Forest should acquire private lands within Tri-Canyons wilderness additions that would prevent mining and development.
Response: A wide range of alternatives are presented with respect to recommendations for Wilderness in the Tri-Canyons. Part of the evaluation of potential for Wilderness is based on an area's availability, that is, what liens are on the parcel which might make it less desirable as Wilderness. Clearly, active mineral claims and rights in a roadless area would make it less suitable as Wilderness. If a decision is made that recommends Wilderness that has private lands with private minerals, it could be in the interest of the Forest Service (and the American people) to pursue this ownership.

1178. The Wasatch-Cache National Forest should not add land acquisitions on the North Slope of the Uintas to the existing wilderness area.
Response: Management direction and/or wilderness recommendations for lands outside federal ownership are not part of this forest plan decision and are outside its scope of considerations.

Access

Access to Forest Lands

1179. The Wasatch-Cache National Forest should acquire more access rights-of-way across private lands. Motorized access is also important.
Response: Acquiring or providing for access and rights-or-way are identified as Priority 1 acquisitions in the revised Forest Plan. While the plan is silent on motorized or non-motorized use, both would be needed.

1180. The Wasatch-Cache National Forest should institute boundary closures for private property owners who block access to public lands.
Response: The revised Forest Plan has a standard on Roads, Trails and Access Management that addresses this question.

1181. The Wasatch-Cache National Forest should establish a motorized access right-of-way across Thousand Peaks Ranch.
Response: Identification of site-specific rights-of-way that could be acquired is not part of this forest plan decision. General direction on the priorities for

acquisition and conveyance are identified, and access to the forest is considered a Priority 1 need.

1182. The Wasatch-Cache National Forest should establish a public access right-of-way in the northern Wellsvilles.
Response: See response 1181.

1183. The Wasatch-Cache National Forest should build an access road through the private property to the north point of Sardine Mountains to allow access to the Sardine Mountains
Response: See response 1181.

1184. The Wasatch-Cache National Forest should acquire a public foot trail access right-of-way to the Mollen's Hollow Research Natural Area to allow botanists access for plant community research.
Response: Part of the reason that the Mollen's Hollow RNA has intact vegetation is because access into the area has been limited. Private lands along the western boundary of the area do not permit easy access from that side, and the Forest Service has not acquired public rights of way or easements from there. The area is accessible from the east off Forest Roads 059 to 221, but this access is not easy. Research scientists can come into the area from this direction to do research.

1185. The Wasatch-Cache National Forest should secure a permanent access easement for non-motorized users south of Hardware Ranch.
Response: See response 1181.

Access to Private Inholdings

1186. The Wasatch-Cache National Forest should process easement applications in a timely fashion for inholders.
Response: The administration and processing of easement applications is not a forest plan decision. However, we recognize the validity of your statement and have passed it on to our lands people and forest management.

Other

1187. The Wasatch-Cache National Forest should replace "add specifics" in the proposed Forest Plan with the intended language.
Response: This section of the Response to Issue 4 has been rewritten in the FEIS.

Letters from Other Government Agencies

Copies of letters and oral comments from other federal, state, and local agencies are reproduced in this section. No letters were received from American Indian tribes.

Letters and comments reproduced here were from:

Federal Government

Congressman James V. Hansen, U.S. House of Representatives, Committee on Resources
USDI, Office of Environmental Policy and Compliance, Denver
USDI, Bureau of Reclamation, Upper Colorado Region, Provo Area Office
US Environmental Protection Agency, Denver
USDA, Natural Resources Conservation Service, Snow Survey Office, Salt Lake City

State Government

State of Wyoming, Office of Federal Land Policy
State of Wyoming, Department of Agriculture, Ron Micheli (transcription of oral comment)
State of Utah, Governors Office of Planning and Budget

Local Government

Cache County, Utah
Summit County, Utah
Salt Lake County, Utah, Parks and Recreation
Uinta County, Wyoming, County Commission, Bob Stoddard (transcription of oral comment)
Ogden, Utah, City Council
Ogden, Utah, Community and Economic Development Department
Salt Lake City Corporation, Department of Public Utilities

United States
Department of
Agriculture

Forest
Service

Intermountain
Region

Wasatch-Cache
National Forest

February 2003

Final Environmental Impact Statement Appendices B - J

APPENDICES B-J

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APPENDIX B - 1

Vegetation Modeling and Timber Suitability

Introduction

The basic analytical framework for the revision of the Wasatch-Cache Forest Plan is prescribed in the NEPA process. A set of alternative scenarios, representing different approaches to the identified needs for change and issues, was simulated over time to provide information to compare and contrast those alternatives in terms of their ability to achieve the Desired Future Conditions (DFC) in cost-effective and least-risk ways. Analyzing the effects of the alternatives included evaluation of vegetation dynamics; terrestrial, aquatic and botanical resource diversity and viability; roads analysis, recreation opportunity spectrum and scenery management system application, and timber suitability, range capability/suitability, oil and gas reasonably foreseeable development, and social and economic analysis. Succession within the aspen, conifer, and oak vegetation types were modeled by using the Vegetation Dynamics Development Tool as described in the following section. Succession within the sagebrush vegetation type was done using a simple model that focused on existing conditions and desired conditions, and how each alternative would move toward those desired conditions. This model is described in more detail in the section titled Sagebrush Modeling starting on page B1-25 of this appendix.

Analysis Processes

Modeling effects on forested vegetation was accomplished using the Vegetation Dynamics Development Tool (VDDT). VDDT is the property of its developers, ESSA Technologies, Ltd., of Vancouver, B. C.

Projecting changes in vegetation structure and composition over time is an important part of landscape-level analyses. Vegetation can change due to a variety of factors such as human activity, fires, insects, pathogens, animals, weather, growth, and competition. The interaction of these factors can be quite complex, and it can be difficult to project the combined effects over long periods of time. VDDT is a software tool that allows the construction of models for the purpose of simplifying those combined effects over time, and examining the roles of various disturbance agents and management activities in vegetation change.

VDDT models were constructed for the Forest for each alternative to address three main questions. These are: first, what set of management activities, if any, must be placed on the landscape to achieve the objectives of a particular alternative? Objectives were generally defined as a mix of structural stages within each vegetation cover type at a particular time. Second, where natural succession and natural disturbances, rather than management activities, determine the future conditions of the forest, what will the forest

look like and how will it function in the near and distant future? Third, what level of timber harvest, if any, is sustainable for this alternative?

Using VDDT software, models covering ten to twenty decades were formulated for each alternative, with analysis units that represented approximately 42 vegetative conditions, described by landscape location, vegetation cover types, and structural stages, moving through time along disturbed or undisturbed successional pathways. The undisturbed pathways followed basic successional processes and were the default unless either a natural disturbance event occurred or a management activity was imposed. Natural disturbances included wildland fire with failed suppression, catastrophic insect and disease events, and catastrophic large-scale fire. Management activities such as livestock grazing, prescribed fire, and timber harvest pushed the analysis units off the undisturbed pathways and onto disturbed pathways that reflected the outcome from such treatment. Desired future conditions (DFC) for each alternative were represented as goals for the number of acres to be maintained in specific structural stages, by cover type or groups of cover types.

Disturbances, both natural and managed, were introduced into the modeling process via probabilities. Some disturbance probabilities were non-linear, allowing, for example, the probability of a catastrophic insect infestation to increase as the proportion of a particular cover type that is prone to infestation (such as old Spruce-Fir) increases. This allowed some recognition of the dynamics of contagion in both fire and insects; however, none of the analysis units were spatially specified beyond the landscape unit in which they occurred, so the spatial component of contagion was ignored.

Developing Analysis Units

Analysis units are made up of forested land with distinctly different characteristics that can be estimated, modeled, combined, and then projected through time to analyze change. The Forest team combined a variety of characteristics to develop analysis units that would focus on ecosystem processes and function while meeting the intent of the National Forest Management Act. The two major vegetation characteristics or components that were combined were structural stage (size class and canopy closure) and cover type. These groupings were then overlaid with rule sets or GIS coverages such as Management Prescription Categories (MPC) to finalize the analysis units and develop the analysis unit acreages for the VDDT model. Analysis units are the acres of a structural stage/cover type combination within a MPC.

Landscapes

The Forest was divided into 3 distinct geographic areas, the Uinta Mountains, the Overthrust Mountains and the Bonneville Basin. The Uinta Mountains region covers the north slope of the range, and includes the Kamas, Evanston and Mountain Ranger Districts. The Overthrust region covers the Bear River Range, including the Ogden and Logan Ranger Districts. The Bonneville Basin is the western portion of the Forest, including the west desert and Stansbury Mountains. Modeling was limited to the Uinta

Mountains and Overthrust Mountains because the likelihood of management activities (other than fire) was considered greater in those areas than in the Bonneville Basin.

Size Classes

The Forest vegetation layer in GIS was used as the basis for determining the breakdown of size classes to be used in modeling. Size classes used in the model were simplified from the vegetation layer to streamline the modeling process, and were based age of the vegetation. Limits of the classes were selected to represent changes that were significant for management purposes.

Conifer Size Classes are:

Grass/Forb - The length of time a stand remains in the grass/forb stage depends upon the species and the level of disturbance that created the grass/forb stage. For most types, the grass/forb persists for approximately 5 years; however, significant disturbance such as stand replacement fire may create a grass/forb stage that persists for several decades

Seedling/Sapling - The seedling/sapling stage is reached when regeneration has progressed to the point that trees become the dominant vegetation on the site. For most forest types, this stage is from 5 to 15 years.

Immature Tree - This class is defined as ages 15 to 80 years.

Mature Tree - Stands between 80 and 150 years are considered mature for purposes of modeling.

Old - The old class is defined as trees greater than 150 years old.

Aspen and Oak Size Classes are:

Grass/forb/seedling/sapling - The grass/forb and seedling/sapling classes are combined in these models, because the sprouting of the aspen and oak occurs concurrently with the grass and forb establishment. The class is defined as 0-10 years in the Overthrust Mountain model, and 0-20 years in the Uinta Mountains model.

Immature tree - The immature class is defined as 10-35 in the Overthrust Mountain model, and 20 to 70 years in the Uinta Mountains model.

Mature tree - Aspen and oak are considered mature after 35 years in the Monte Cristo area, and 70 years in the Uinta Mountains.

Canopy Closure

The density of the vegetation was categorized into 3 canopy closure categories. They are used to determine the potential risks from insects or wildfire, to estimate species composition, and to reflect the effects of management activities and natural disturbances. The higher the stand density, the less light reaches the forest floor, which favors climax species and increases the risk to insects and lethal fire. Some cover types, due to the harsh sites, do not reach a high-density condition, but only progress to moderate canopy closure. Management activities such as thinning and grazing may move stands from a high-density class to a lower density class. Similarly, fire, both natural and prescribed, may modify the density of the vegetation resulting in a shift from one class to another.

Canopy Closure groups are:

- **Low (less than 40% canopy closure)**
- **Medium (40-70% canopy closure)**
- **High (greater than 70% canopy closure)**

Vegetation Cover Types

Vegetation composition is influenced by environmental (site) characteristics. Using cover types to classify the landscape provides a logical framework for studying succession, or vegetation changes over time.

Cover types were then used to group size class and canopy closure into ecological units that would have similar responses to disturbances and have similar pathways through the successional stages. These groupings became the basis for the VDDT model, and understanding the ecological process and function of the vegetation. A model was developed for each cover type. The 6 individual cover type models were combined into a forest vegetation model that projected changes for all cover types simultaneously. A version of the combined model was run for each Forest Plan alternative to project vegetation changes associated with that alternative.

Cover Type Groups used in modeling are:

1. **Douglas Fir**
2. **Spruce Fir**
3. **Mixed Conifer / Lodgepole Pine**
4. **Stable Aspen**
5. **Seral Aspen**
6. **Oak**

Seral aspen presented a unique challenge because it is associated with all of the other forest types. Generally, seral aspen is shown on the vegetation layer as aspen/conifer (if conifer comprises less than 50% of the stand composition) or conifer/aspen (if conifer comprises more than 50% of the stand composition). It represents aspen stands that are currently undergoing conversion to conifer due to encroachment. If the conifer

encroachment continues long enough, aspen will be replaced by conifer to the point that eventually it will disappear from the stand. To reflect this potential, the seral aspen model was incorporated into each of the conifer models as a separate successional pathway parallel to the conifer pathway, which merges with the conifer at advanced stages. This permits us to model the loss of aspen in the absence of fire or mechanical disturbance, and to reflect the potential to maintain or increase the aspen component through disturbance of aspen/conifer or conifer/aspen stands.

Seral aspen stands were included in the appropriate model based on the major conifer species present in the stand. For example, a Douglas-fir/aspen stand was modeled in the seral aspen pathway of the Douglas-fir model.

Tentatively Suited Timberlands

Reassessment of tentatively suited timberlands has been completed in accordance with the National Forest Management Act, as contained in Forest Plan regulations 36 CFR § 219.14 and Forest Service Handbook FSH 2409.13, Chapter 20. The National Forest Management Act requires that, as a minimum, lands previously identified as not suited be reassessed at least every 10 years. Since current efforts to revise the Forest Plans coincide with the need to reassess timberlands not suited, a complete reassessment of suited timberlands has been performed. This allowed for a comprehensive examination of the status of timberlands that took into account changes since the previous assessment of timberlands. Some of these changes include changes in land ownership, increased knowledge and experience with reforestation efforts, wildfire events, and increased knowledge and experience regarding timber management effects on soils and watersheds.

Assessment of tentatively suited timberlands was accomplished using Geographic Information Systems (GIS). Use of GIS results in consistent identification of each of the following data elements:

- Net National Forest land area administered.
- National Forest lands that are not forested.
- National Forest lands that have been withdrawn from timber production.
- Areas that are physically unsuited for timber production due to the inability to assure adequate restocking, or irreversible damage to soils or watersheds.

Table B-1. Steps and Data Sources for Assessing Tentatively Suited Lands

Steps for Assessing Tentatively Suited Lands	Data Sources
1). Determine net National Forest system land area for each National Forest.	Lands data in GIS
2). Identify non-forested lands. These lands include: • Non-forest vegetation cover types • Roads. • Streams. • Lakes, ponds and reservoirs >= 1 acre is size. • State and county roads on National Forest system lands	Non-forest vegetation cover for the cover types identified here came from satellite imagery. The remaining items identified are from several data layers in GIS.
3). Identify and subtract National Forest system lands that have been withdrawn from timber production including: • Designated wilderness areas. • Research Natural Areas. • Wild segments of wild & scenic rivers (outside of wilderness areas). • Experimental Forests • Other withdrawn areas * Utility right-of-way corridors. * Electronic sites. * Administrative sites (unless previously identified in step 2 as areas withdrawn from timber production). * Developed campgrounds. The products resulting from completion of steps 1, 2 and 3 will be: Identification of available forested lands, identification of unavailable withdrawn lands, and non-forested lands.	Each of the identified items is available from data layers in GIS .
4). Identification of physically unsuited lands. ▪ Slopes greater than 40% ▪ Elevations over 10,000 feet ▪ Timber operability limits	Vegetation Cover Type Maps , USGS digital elevation models, Timber operability mapping (wet areas).

Vegetation Dynamics

The primary conceptual model for vegetation dynamics is that any given unit of vegetation will change over a period of time, succeeding through some arbitrarily defined set of stages if undisturbed; if disturbed, either naturally or by management, the vegetation will instead change through a different set of stages. Each potential set of stages, in sequence, is called a pathway.

Pathways and Probabilities

Successional pathways, with or without disturbances, summarize scenarios in vegetation dynamics. Modeling such scenarios so as to have a quick and simple, yet useful, way of

observing changes over time necessarily requires that only the most basic driving forces be included. Perhaps more importantly, many of those forces exert themselves as events which are expected to occur but for which the timing and frequency are essentially random. While management activities are disturbances that may be accurately predicted, natural disturbances may only reasonably be predicted in terms of historical probabilities. The outcomes from those disturbances, then, are also necessarily probabilistic. Clearly, the interaction of the many biological and physical factors that are at work can be quite complex, and it can be difficult to project their combined effects over long periods of time; the longer the scenario, the less certain the outcome.

Scenarios can define different sets of assumptions about fire suppression, insects and disease, or forest management objectives, by assigning probabilities to the applicable successional pathways. In each scenario, changes in the dominant disturbance types and their frequency result in changes in the vegetation. For example, a reduction in fire frequency, representing an assumption of increased fire suppression success, may increase the number of acres in a condition that is more susceptible to insects. In that case, without changing the probability of insect-caused disturbance, more insect-caused disturbance will occur in the model because more land area is in the more susceptible condition.

Undisturbed Succession

Changes in vegetative conditions due to dynamics such as regeneration, growth, and self-thinning, form the basic successional pathway in the absence of disturbance. Some successional pathways are cyclical, indicating the likelihood of some self-limited lifespan, followed by self-regeneration and repetition of the cycle, unless disturbed. Other successional pathways have an end condition that represents a steady state that can be maintained perpetually.

Modeled changes due to successional dynamics are defined by the time that a vegetative unit remains in a particular stage, and by the stage into which it will move after that time has passed. Figure B-1 displays an example of a VDDT model showing successional pathways, and the time required to move between classes.

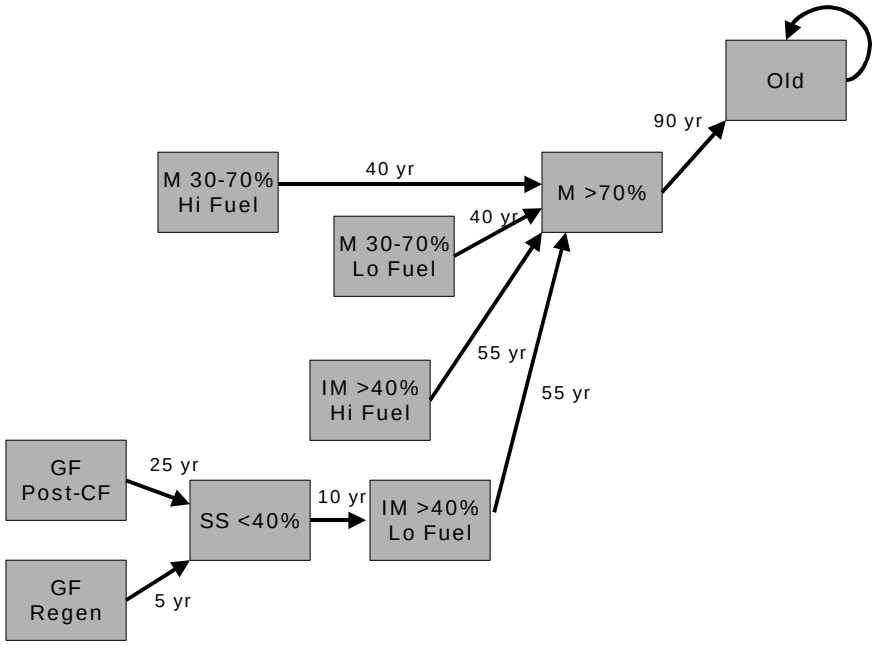


Figure B-1. Example of successional pathways in VDDT models, showing successional classes and length of time required moving to next class in the absence of disturbance.

Natural Disturbances

Disturbance-related pathways specify, for each stage, the type of disturbance, its probability (which defines its return frequency) and its impact on the vegetation. The impact is represented by the different stage to which the vegetative unit has been transferred as a result of the disturbance. That new stage may be on the undisturbed pathway, representing a simple setback in succession, or it may be on another pathway entirely. Figure B-2 is an example of a model showing successional pathways and natural and management disturbance pathways.

Insects and Disease

For example, a unit defined as being Douglas-fir, mature, with greater than 70% canopy closure, may be given a 0.1% probability of experiencing an infestation of beetles. If the infestation does not occur, that unit may remain in its current stage for a defined number of years, eventually succeeding to the next stage along the undisturbed pathway. However, if the infestation does occur, the unit may be transferred to a different stage, defined as Douglas-fir, mature, 30%-70% canopy closure, with high fuel loads. This new stage is not on the undisturbed successional pathway.

Wildland Fire

The same vegetative unit may also have some probability of incurring the effects of a wildfire. If that disturbance occurs, the unit may be transferred to a stage defined as Douglas-fir, grass-forb stage, regenerated. This new stage is on the undisturbed successional pathway, representing the starting point for the pathway.

Management Disturbances

From a modeling perspective, there is no technical difference between natural disturbances and management disturbances. They go into the models in exactly the same way. The conceptual difference is in the calculation of probabilities, and in how they are used.

Management disturbances are the controlling input factors for the models. The objectives for a particular scenario may call for a certain mix of vegetative stages by a certain time, and the management disturbances must be adjusted up or down in terms of probability so as to achieve those objectives.

For example, where initial conditions are that most of a cover type is in older stages, the scenario objectives may require that at least half of that cover type is in an immature or younger condition within some time span. To accomplish that, some combination of management activities that result in moving the vegetation to younger stages must be implemented. A set of initial probabilities can be calculated as a starting point for the model; after running the model, if the objectives are not achieved, the probabilities can be adjusted up or down in successive runs until the desired results are seen, or until it is reasonably proven that the desired results are not feasible.

Prescribed Fire

Intentional disturbance by setting fire to the vegetation, or by allowing naturally occurring fires (wildland fire use) to burn, are treated as “prescribed fire” in these models. The result of the fires depends on the cover type and structural stage in which they occur. The impacts in some cases are lethal, causing the vegetation to be transferred to a “regenerated” stage; or the impacts may be non-lethal, resulting in transfer to a less dense stage. In some cases, fire simply maintains the vegetation in its current stage, preventing it from moving along its undisturbed successional pathway.

Timber Harvest

Harvest disturbances include partial harvests such as thinnings, regeneration harvests, and salvage harvests. They are designed to achieve silvicultural objectives and to produce salable timber products. The stages to which vegetation units are transferred after a harvest disturbance are intended to represent the desired silvicultural conditions that prompted the planned activity. For example, a partial harvest on a unit in a stage defined as Douglas-fir, immature, greater than 40% canopy closure, may result in the transfer of that unit to a stage defined as Douglas-fir, mature, 30%-40% canopy closure. Such a disturbance would represent the planned thinning of an overly dense unit by removing the

smaller and younger trees, thereby reducing the density and increasing the average size and age of the remaining trees to achieve silvicultural objectives related to increased resistance to insects while increasing the commercial timber value of the unit.

Livestock Grazing

Grazing by permitted livestock was included in the models as a management disturbance due to the effects that grazing has on many aspects of vegetation dynamics. For example, in a vegetation unit consisting primarily of seral aspen, grazing may increase the rate at which the aspen converts to conifer by eliminating aspen sprouts through browsing while leaving the conifer seedlings untouched.

Mechanical Treatment

The oak cover type model included mechanical treatment to reduce densities and average ages of the vegetation units. Essentially similar to a thinning harvest treatment, there is no commercially viable commodity produced by this management activity. The primary objective is to reduce frequency and intensity of fires through the construction and maintenance of fuel breaks in the urban interface. This treatment will tend to occur periodically on the same acres, so was not modeled. Prescribed fire that is used to change the structural stage of the stand was modeled.

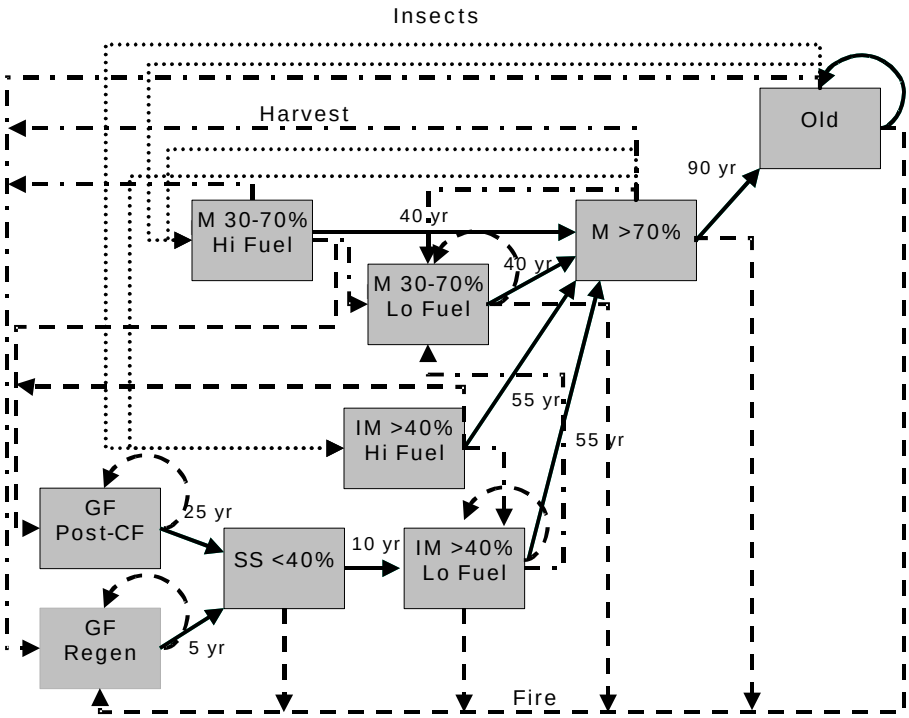


Figure B-2. Example of VDDT model showing successional and disturbance pathways.

Development of Alternative Models

The same models were used for the two geographic areas modeled; however, differences in growth potential of the sites were reflected in longer time spans to move between classes where appropriate. Where differences existed, the models were modified to reflect those differences. The primary occurrence of this was in modeling stable aspen stands. Stable aspen in the Overthrust Mountains attains greater size than does aspen in the Uintas, so two separate stable aspen pathways were developed.

Assumptions Used in Model Development
As discussed above, succession pathways were developed to display how stands would progress over time in the absence of disturbance. Disturbances serve to "deflect" acres from the successional path, with the affected acres being directed to different endpoints, depending upon which disturbance caused the deflection. The general assumptions used in model construction are outlined below.

Aspen:
Aspen occurs in two distinct types on the Wasatch-Cache: (1) stable or self-regenerating stands, and (2) successional stands which occupy a site following disturbance, and which will eventually be replaced by conifers in the absence of continued disturbance. Two separate models were developed to reflect the differences between these aspen types.

The stable aspen type regenerates quickly following disturbance by sprouting from the root system. Typically, large numbers of seedlings occur on the site and grow rapidly into the seedling/sapling and immature classes. Stands reach maturity in approximately 35 years, and will persist in the absence of disturbance for several decades. Harvest or fire or insect/disease caused mortality will move the affected acres back to the grass/forb and seedling/sapling stage. Heavy grazing pressure from livestock or wildlife can reduce the number of aspen sprouts and delay stand development. To reflect the successional and disturbance pathways for this type, a model with 4 stages or classes was developed. The classes are: grass/forb/seedling/sapling (GS/SS), Immature (IM), Mature with 40-70% canopy closure (M4-7), and Mature/Old with greater than 70% canopy closure. The time required to move along the successional path between classes is: GS/SS to IM - 10 Years, and IM to M/O - 25 years. Grazing disturbance will send affected acres into the M4-7 class, which then takes 35 to 70 years to move into the M/O. This latter path reflects the effects of continued heavy grazing pressure on stand succession. Prescribed fire or failed fire suppression will move acres from their current class to the GS/SS class, where they begin the successional sequence over again.

Successional aspen required a different model because of its unique role. We assume that conifers, aspen, or both may occupy an acre of land in this type. Aspen typically occurs immediately following fire or other major disturbance on acres where it had a pre-disturbance presence and had a root system to provide sprouting. Rapidly growing root sprouts gain early dominance of the site and provide a moderating effect on the site conditions that facilitates conifer seedling establishment. Conifers will begin to seed in and will continue to increase in numbers and size throughout the life of the stand.

Eventually, without disturbance to reduce the conifer competition and promote aspen regeneration, conifers will come to dominate the stand. Over many decades, the shorter-lived aspen will die out, and eventually the stand will be converted to conifer. To display the effect of this relationship, successional aspen was modeled as an alternate pathway of the dominant conifer model (aspen/Douglas-fir, aspen/spruce, aspen/mixed conifer). The aspen successional pathway in the model uses the same 4 classes as the stable aspen, but has 3 additional classes representing the increasing dominance of conifers. Disturbances that occur before aspen has been eliminated from the stand will send affected acres back to the aspen pathway. However, after approximately 300 years without stand replacing disturbance, acres will move into the conifer pathway. Disturbances occurring after 300 years will move acres back along the conifer pathway, reflecting elimination of aspen from the stand.

Spruce-fir:
The spruce-fir successional pathway proceeds from grass/forb (GF) to seedling/sapling (SS), immature (IM), mature (M), and ultimately, to old (O). The assumption is that it will take 10 years to regenerate and move from GS to SS, 10 years from SS to IM, 60 years from IM to M and 60 years from M to O. Therefore, an acre of this type will require 140 years to reach the oldest class, and will remain there for many decades in the absence of disturbance. Disturbances will affect the time it takes to reach a particular class, and in some cases, the class that the affected acre moves into. For example, insect outbreaks that kill the overstory trees will create a structure of seedlings with a heavy fuel loading resulting from the dead trees. Some of the acres from this new class will follow the successional path and move toward the endpoint. However, the high fuel loading will predispose the stand to wildfires. Fires in this class will tend to be high intensity and will create conditions that make regeneration difficult (large openings, potential for soil erosion, subject to temperature extremes, etc.) Therefore, regeneration will take considerably longer than projected in the normal successional pathway. To reflect this possible outcome, insect outbreaks in the model put acres on a pathway to a seedling/sapling high fuel class, from which some acres will proceed to the immature class, and some will follow the fire path into post-fire GF class. Once in the post-fire GF class, acres will remain there for 50 years, reflecting the long regeneration period as a result of the high intensity fire.

Harvest treatment disturbances move acres into various classes, depending upon the level of harvest. Regeneration harvest will move acres to the GF class; thinning will move acres into a class with a lower canopy closure, and will reduce the length of time needed for them to move into the next higher class on the successional pathway. For example, partial harvest that occurs within the IM class will direct those acres to a mature, 40-70% canopy closure class. From that class, it takes 25 years to reach the M class, instead of the 60 years required without thinning.

Douglas-fir:
The Douglas-fir model is very similar to the spruce-fir model, with succession progressing through the same classes. However, Douglas-fir tends to occur on lower quality sites than spruce, so requires a longer time period to reach the old class (155 years

vs. 130 for spruce). Douglas-fir stands are also susceptible to bark beetle mortality, and acres affected by beetles are directed to a high fuel SS class similar to that in the spruce-fir model. As with spruce-fir, fires occurring in the high fuel class will tend to be high intensity and move the affected acres back to a post-fire GF class. Douglas-fir is more tolerant of these conditions than is spruce, so while the effect is to delay regeneration, it delays it approximately 25 years, rather than the 50 years in the spruce-fir model. Low or moderate intensity prescribed fires can be used to perpetuate Douglas-fir stands, by removing excess trees and preparing sites for natural seeding. The model addresses the use of fire at every class, with the effects depending upon the severity of the fire. High intensity prescribed fire will send acres along a path to GF, while moderate or low intensity fires will send acres to less dense classes (such as mature, 30-70% canopy closure, low fuel), or cycle them back through their current class.

Mixed Conifer/Lodgepole:

The mixed conifer/lodgepole pine model is similar to the other conifer models, with some differences based on geographical area and the presence of lodgepole pine. Lodgepole pine is a fire-adapted species, and seeds in readily after stand replacing fires, even over extensive areas. Therefore, the model displays a relatively rapid progression through the GF and SS classes.

Mixed conifer stands in the Bear River range grow rapidly, moving to the mature class in approximately 50 years, and the old class in 145 years. Stands in the mature and old classes are susceptible to bark beetles, but the mixed species composition tends to prevent stand replacement epidemics. Rather, a beetle attack will affect only a particular species while leaving the other species unaffected. The result is a thinning of the canopy closure of the stand, a shift in the species composition, and an increased fuel loading from the dead trees. To reflect this, the Overthrust model contains a mature, low canopy closure, high fuel class (M<4H). Acres reach this class via the insect disturbance path from the mature and old classes. Once in this class, acres will either follow the succession pathway, or one of several disturbance pathways, including regeneration harvest, salvage, or a high intensity fire. In the latter case, the presence of lodgepole pine will rapidly regenerate the stand, avoiding the delay experienced by spruce-fir and Douglas-fir stands.

Mixed conifer stands in the Uinta Mountains grow more slowly, taking approximately 80 years to reach the mature class versus 50 years for the Bear River Mixed Conifer type. This is in part due to the extremely high number of trees per acre that reduces the growth of the individual trees. In addition, some acres are so densely regenerated that the stand stagnates, or grows very slowly, such that trees 80 years old may be only 4 – 6 inches in diameter. Without some disturbance, these stagnated stands will remain in that condition for many decades. Therefore the Uinta Mountain Mixed Conifer/Lodgepole pine model contains an additional pathway from GF to dense seedling/sapling (SS>4) and ending at a stagnated pole class (P>7). Stands will remain in that class unless harvest, prescribed fire, or failed fire suppression moves them along a disturbance pathway. Insect affects are modeled the same as for the Bear River MC.

Oak:
Oak is a very simple model compared to those for aspen and conifer forest types. The model contains only 3 classes, seedling/sapling, mature, and old. Oak sprouts prolifically from the root collar following disturbance, and reaches the old class in only 40 years. The disturbances modeled are limited to mechanical treatment, prescribed fire, and failed fire suppression, with all disturbance pathways leading to the seedling/sapling class.

Populating the Model

Once the models were constructed, the existing forest types were assigned to a class in the model. Forest GIS layers were used to sort and summarize forest stand data based on species, size class and density. The forest stands on the Wasatch-Cache tend toward the oldest classes, and have not been significantly affected by disturbances for several decades. Therefore, the majority of stands were put in the oldest class that was the closest fit to the size class and density, regardless of the actual stand age. Mixed conifer/aspen stands were put into classes within the MC model based on the dominant species, i.e., conifer/aspen stands in the database (those with conifer representing more than half the stand) went into classes within the model that had conifer as the dominant species. Aspen/conifer (stands with aspen comprising more than half the stand) went into classes with aspen dominant. The database did not have size class and density data for oak, so the determination of where in the model those stands were placed was based on knowledge of Forest personnel. We know that approximately 4000 acres had burned within the last 10 years, so that number of acres was placed in the seedling class. The rest of the oak acres were split with approximately 75% put in the oldest class, and 25% in the mature.

Management Prescription Categories (MPCs)
The array of MPC assignments to the alternatives was modeled in VDDT. See Appendix D-1 in this EIS for a complete description of MPCs.

All National Forest lands were assigned to a particular management prescription category based on the capabilities of the land, management opportunities and needs, and the management emphasis of the alternative. GIS layers were created for each alternative that displayed the MPC assignments. These layers were merged with the vegetation layer to determine the number of acres in each MPC for each alternative. The resultant data was used to create initial conditions files for each alternative in VDDT that reflected the distribution of acres into MPCs. A particular area may be assigned to 5.2 in Alternative 5, while it may be assigned to 3.2 in Alternative 6, for example.

In the model, MPCs were sorted into the following 6 groups, with each consisting of MPCs that would have similar probabilities of various disturbances or treatments for each cover type, age class, alternative and prescription.

- Group 1 includes all wilderness, and other MPCs that would not allow vegetation manipulation (1.x, 2.4,2.7).
- Group 2 includes backcounty and recreation emphasis (2.6, 4.1,4.2,4.3,4.4, and roadless portions of 3.1,3.2,5.1,6.1).
- Group 3 includes scenic byway and developed recreation MPCs (2.5, 4.5).

- Group 4 includes aquatic and terrestrial habitat emphasis (3.1, 3.2).
- Group 5 includes forest and range vegetation treatments designed to meet PFC (5.1, 6.1).
- Group 6 includes commercial and economic opportunities from timber management and forage production (5.2 and 6.2).

The number of acres within each management prescription category and where those prescriptions are mapped on the land are the primary differences between alternatives. For example, Alternative 1 designates no forested lands as MPC 5.2/6.2 (commodity emphasis), while Alternative 5 designates a high percentage of forested lands as MPC 5.2/6.2. Therefore, Alternative 1 would project no commodity-emphasis harvest, while Alternative 5 would project a relatively high level of harvest. Other alternatives have varying amounts in MPCs that permit harvest or other types of management activities.

Differences between alternative objectives also are reflected in the probabilities assigned to each disturbance. Probabilities were assigned based on the emphasis of the alternative. Those alternatives that permit timber harvest have relatively high probabilities for various harvest treatments and lower probabilities for other treatments such as prescribed fire. Timber harvest probabilities are higher for MPC 5.2 and 6.2 than for MPC 3.2, because in the latter case, while harvest may be used to improve or maintain wildlife habitat, it is not a regular occurring activity and would generally occur on a smaller scale than in MPC 5.2/6.2.

MPCs that preclude mechanical treatments or where management direction focuses on restoration without providing for a sustainable level of outputs were considered "unsuited", and any timber volume removed from them would not accrue to the Allowable Sale Quantity (ASQ). MPCs 5.2 and 6.2 emphasize commodity production and are labeled as "suited". Mechanical treatments within unsuited MPCs will accrue volume (based on outcome of meeting Desired Future Conditions) toward the Total Sale Program Quantity (TSPQ). Mechanical treatments within MPC 5.2 and 6.2 will accrue volume (based on outcome of meeting DFCs) towards the Allowable Sale Quantity.

Limits

Limits, in a modeling sense, are used to represent physical, ecological, financial, legal, or social thresholds that simulation must fall within in order to be considered reasonable or appropriate. For example, budgetary requirements to implement an alternative must be within reason compared to experienced budget levels and Desired Future Conditions attainment must comply with other resource management objectives consistent with a given alternative. Models of alternatives had to satisfy numerous types of limits in order to be feasible. The most common limits applied were for acres treated in any given time period; the number of acres had to be feasible given expected funding levels for the alternative.

Timber Harvest Program

The model projects outputs in relation to (1) the probability of occurrence assigned in the model and (2) the number of acres in a particular class. Harvest levels were estimated by

the model by running successive iterations with different probabilities to develop a non-declining harvest level. If additional funding would be required to achieve the output level of a particular alternative, that is noted in the discussion of effects in Chapter 3 of the EIS.

Inventory Volume

Inventory data was pulled from RMRIS for the various vegetation types. The number of stands varied considerably within the database, ranging from less than 10 for aspen in the Cache to 80 Douglas-fir stands in the Cache, to a maximum of over 1200 lodgepole pine stands in the Uinta Mountains. The average volume for all stands in the database that met the criteria for location and type was summarized for the Cache and the Wasatch portions of the forest. Stand data was sorted based on the predominance of the trees in the stand into sapling, medium (majority of basal area in trees 5-8.9 inches), large (majority of basal area in trees 9-15.9), and very large (majority of basal area in trees 16+). The average volume was determined for all the stands within a size class.

In addition, since some age categories were not represented in the database (primarily the younger age classes such as sapling and immature), Stands were modeled with FVS and the projected volume at the various ages was determined. Projected data was compared with inventory data to determine a reasonable average volume to be used in the model, based on personal knowledge of the variety of stand conditions. For example, because DF and SF often occur as dense clumps within a patchy mosaic, the projected volumes were compared with the actual inventory volumes and reduced to account for the patchy nature. For example, the DF projection for the Uinta Mountains showed a volume per acre of 36 ccf for stands >130 years old. While that is probably reasonable for a continuous stand, it may overstate the actual volume within a mapped polygon due to openings of various sizes and uneven distribution of trees. In addition, the model classes cover a range of ages, and applying the projected volume to the entire class would overstate the volume for those stands near the lower limit of the class.

Harvest Removal Volume

Harvest volume was determined as a percentage of the inventory volume for cover type and model class. It was decided to use a percentage rather than a volume value, because it is easier to discuss harvest levels as a percentage of the standing volume than to try to determine the actual volume from a variety of stand conditions. The following percentages were used in the model.

- Regeneration harvest other than spruce fir = 90%
- Regeneration harvest in spruce fir = 50% (reflects group selection/shelterwood)
- Heavy Partial harvest = 40%
- Medium partial harvest = 30%
- Light partial harvest = 20%

The VDDT model output displayed the volume harvested by applying the above percentages to the inventory volume for each acre that followed the particular harvest pathway. For example, if the model determined (based on the probability of disturbance)

that a particular acre of spruce-fir would be harvested for regeneration, 50% of the inventoried volume for that acre would be shown as harvest volume.

Non-Declining Yield

Non-declining yield was defined as no decrease in yield from one decade to the next that exceeded 15%. This level of variation seemed reasonable, given the errors associated with the various components that go into determining yields. We know there is a margin of error associated with the land classification; a margin of error associated with the prescription boundaries, and a margin of error associated with the timber yield data. When those three are multiplied together to generate yields for ASQ, the error is multiplied, also. If each of those had 95% accuracy, the result would be 86% accurate. We therefore concluded that a 15% deviation between decades would not be unreasonable when estimating non-declining flow. Successive runs of the model were made to determine the long-term trend of a given harvest level. Probabilities were adjusted to produce a relatively even flow of timber volume over a 100-year period. Projected ASQ levels for each alternative were tested to make certain they reflected a non-declining harvest level.

Long-Term Sustained Yield Capacity

Long-term sustained yield capacity was calculated by the model and reflects the highest uniform wood yield that can be sustained from lands being managed for timber production for each alternative.

Disturbance Probabilities

Probabilities were determined for each disturbance (management or natural) for each model class within the 6 groupings, based on the likelihood of that disturbance occurring in that MPC group under a particular alternative. Alternatives that emphasis natural rather than management disturbances would have a relatively high probability for wildfire and insect disturbances, and low probabilities for harvest and prescribed fire. For example, Alternative 1 permits no harvest or prescribed burning, but does permit wildland fire use. Therefore, the probability of harvest is 0, and the probability of prescribed fire is relatively low (prescribed fire in the model includes both management ignition and naturally ignited wildland fires) because the only occurrence would be wildland fire use. However, the probability of failed fire suppression was relatively high, due to the age and condition of the forests.

In contrast, Alternative 5 emphasizes economic benefits from timber harvest and grazing. A high percentage of the forested lands are within group 6 MPCs permitting a relatively high level of timber management. Therefore, the probabilities for harvest disturbances are relatively high, and the probability of high intensity prescribed fire are low. With the emphasis on management, failed fire suppression is less likely, due to the presence of roads and the amount stand structure manipulation that would occur with a harvest emphasis.

Wildland Fire

Fire probabilities were estimated using fire frequency and size data collected on the Forest over the last 30 years. From this data it was determined that 83% of the fires were less than 1 acre in size, 15% were between 1 and 1000 acres, and 2% exceeded 1000 acres. The number of fires and the size of the average fires were used to estimate the frequency of normal, high, and severe fire years. These frequencies were entered into the model to help understand potential for the occurrence and size of unplanned fires on the Forest. A projection of two severe fire years in a 100 year period was used in the model. Although the model does not predict when such years will occur (or if in fact they will occur), it is useful to look at the effects on vegetation of large burns in comparison to smaller, more frequently occurring fires.

Insects and Disease

Probabilities for insect attack are dependent upon the age and size of forest stands. Older, denser stands of large trees are most susceptible to the important insects, such as spruce beetles and mountain pine beetles. Therefore the older structural stages in the model received relatively high probabilities, while younger or less dense stages received low probabilities.

Sensitivity Testing the Model

The VDDT model estimates various outcomes based on probabilities of a particular disturbance occurring over time. Determining the sensitivity of the model to these disturbances is critical to understanding the reliability of the results in predicting the relative differences between alternatives. The model contains 2 stochastic disturbances (insects and failed fire suppression) and 2 management disturbances (harvest and prescribed fire). To determine how sensitive the model is to each of these disturbances, runs were made with the base level disturbance probability and with a 1% increase in the probability. The results of the two runs were compared to see how great the difference in results for each disturbance. A disparity between the increased probability for a particular disturbance and the estimated acres disturbed indicates that the model is sensitive to that particular disturbance. If the model is not overly sensitive, a 1% increase in a disturbance should result in approximately a 1% increase in projected acres affected in the model output. Generally, a 1% increase in probability resulted in slightly less than a 1% increase in disturbed acres for all 4 disturbances tested, when comparing individual decade results. Over the 10 decades projected, the increase was approximately 1%. Tables B-2a through B-2d presents the results of the sensitivity testing for disturbances.

The sensitivity of the model to the initial conditions was also tested, to make certain the projected results were not dependent upon the number of acres in a particular class at the beginning of the model run. The procedure to test initial conditions was to select a class that contained a large acreage of a particular species, remove a percentage of the acres in the class and redistribute them equally to the other classes in the model. The model was then run and the distribution of acres over time reviewed to make sure the acres moved through the model in the expected manner during the decades projected. If the acres had built up in a particular class instead of moving through, it would have indicated that the

results were dependent upon the initial conditions. To test the model, spruce-fir in the Uinta Mountains was selected, because it has the largest acreage in the old class, and no acres in the two youngest classes. The initial conditions were reset by removing 20% of the acres from the old class and distributing those acres uniformly to the remaining 4 classes (GF, SS, IMM, MAT). The model was then run for 100 years to see if the acres moved through the classes over time. Table B-3 displays the results of this test. Acres did not accumulate in a particular class, but moved through the classes in accordance with the succession pathways.

Sensitivity Test of Harvest Disturbance					
One Percent Increase in Disturbance Probability					
Decade	SS	IMM	MAT	OLD	Total
1	41	1,315	11,469	4,357	17,183
2	41	1,274	11,634	3,042	15,991
3	123	1,973	11,757	3,453	17,307
4	123	2,220	9,825	2,631	14,799
5	82	2,713	10,688	2,713	16,197
6	41	3,289	8,715	1,809	13,853
7	164	3,823	8,386	1,727	14,100
8	0	3,864	8,879	1,932	14,676
9	0	3,700	7,235	3,823	14,758
10	41	4,152	9,003	3,289	16,484

Sensitivity Test of Harvest Disturbance					
Base Level Disturbance Probability					
Decade	SS	IMM	MAT	OLD	Total
1	41	1,315	11,469	4,316	17,142
2	41	1,274	11,551	3,042	15,909
3	123	1,973	11,716	3,453	17,265
4	123	2,179	9,825	2,672	14,799
5	82	2,713	10,524	2,754	16,073
6	0	3,289	8,756	1,809	13,853
7	164	3,823	8,468	1,809	14,265
8	0	3,823	8,797	1,932	14,552
9	0	3,700	7,153	3,782	14,634
10	0	4,111	9,044	3,248	16,402

Percent Change in Results					
Resulting From 1% Change in Probability					
Decade	SS	IMM	MAT	OLD	Total
1	1.0000	1.0000	1.0000	1.0095	1.0024
2	1.0000	1.0000	1.0071	1.0000	1.0052
3	1.0000	1.0000	1.0035	1.0000	1.0024
4	1.0000	1.0189	1.0000	0.9846	1.0000
5	1.0000	1.0000	1.0156	0.9851	1.0077
6	#DIV/0!	1.0000	0.9953	1.0000	1.0000
7	1.0000	1.0000	0.9903	0.9545	0.9885
8	#DIV/0!	1.0108	1.0093	1.0000	1.0085
9	#DIV/0!	1.0000	1.0115	1.0109	1.0084
10	#DIV/0!		0.9955	1.0127	1.0050

Table B-2a. Sensitivity Test Results for Harvest Probabilities.

Sensitivity Test Rx Fire				
Base Level Disturbance Probability				
Decade	IMM	MAT	OLD	Total
1	123	3,206	2,220	5,550
2	123	2,754	1,521	4,399
3	123	2,590	1,973	4,686
4	123	3,042	1,439	4,604
5	247	2,425	1,480	4,152
6	206	2,590	1,439	4,234
7	206	2,097	987	3,289
8	247	2,631	1,069	3,946
9	329	2,384	1,110	3,823
10	370	1,891	1,192	3,453

Sensitivity Test Rx Fire				
One Percent Increase in Disturbance Probability				
Decade	IMM	MAT	OLD	Total
1	123	3206	2220	5550
2	123	2754	1562	4440
3	123	2590	1973	4686
4	123	3083	1439	4645
5	247	2425	1480	4152
6	206	2672	1480	4357
7	206	2097	987	3289
8	247	2713	1069	4029
9	329	2425	1110	3864
10	411	1891	1233	3535

Percent Change in Results				
Resulting From 1% Change in Probability				
Decade	IMM	MAT	OLD	Total
1	1.0000	1.0000	1.0000	1.0000
2	1.0000	1.0000	1.0270	1.0093
3	1.0000	1.0000	1.0000	1.0000
4	1.0000	1.0135	1.0000	1.0089
5	1.0000	1.0000	1.0000	1.0000
6	1.0000	1.0317	1.0286	1.0291
7	1.0000	1.0000	1.0000	1.0000
8	1.0000	1.0313	1.0000	1.0208
9	1.0000	1.0172	1.0000	1.0108
10	1.1111	1.0000	1.0345	1.0238

Table B-2b. Sensitivity Test Results for Prescribed Fire.

Sensitivity Test Insects				
Base Level Disturbance Probability				
Decade	IMM	MAT	OLD	Total
1	0	6,575	5,013	11,588
2	0	6,780	3,205	9,985
3	0	7,684	3,164	10,848
4	82	8,917	2,794	11,793
5	0	11,218	3,739	14,957
6	41	9,616	2,507	12,164
7	41	10,314	3,671	14,026
8	123	9,164	3,287	12,574
9	0	7,479	4,520	11,999
10	82	7,027	5,465	12,574

Sensitivity Test Insects				
One Percent Increase in Disturbance Probability				
Decade	IMM	MAT	OLD	Total
1	0	6,616	5,054	11,670
2	0	6,862	3,205	10,067
3	0	7,766	3,123	10,889
4	82	8,999	2,794	11,875
5	0	11,424	3,739	15,163
6	41	9,657	2,507	12,205
7	41	10,396	2,712	13,149
8	123	9,287	3,287	12,697
9	0	7,602	4,561	12,163
10	82	7,109	5,342	12,533

Percent Change in Results				
Resulting From 1% Change in Probability				
Decade	IMM	MAT	OLD	Total
1	#DIV/0!	1.0062	1.0082	1.0071
2	#DIV/0!	1.0121	1.0000	1.0082
3	#DIV/0!	1.0107	0.9870	1.0038
4	1.0000	1.0092	1.0000	1.0070
5	#DIV/0!	1.0184	1.0000	1.0138
6	1.0000	1.0043	1.0000	1.0034
7	1.0000	1.0080	0.7388	0.9375
8	1.0000	1.0134	1.0000	1.0098
9	#DIV/0!	1.0164	1.0091	1.0137
10	1.0000	1.0117	0.9775	0.9967

Table B-2c. Sensitivity Test Results for Insects.

Sensitivity Test Failed Fire Suppression						
Base Level Disturbance Probability						
Decade			IMM	MAT	OLD	Total
1	41	0	41	1,603	5,383	7,068
2	247	329	1,192	17,464	56,584	75,816
3	41	41	329	4,849	8,506	13,766
4	0	0	0	1,890	2,383	4,273
5	0	0	123	2,424	1,644	4,191
6	164	329	1,644	29,299	26,053	57,489
7	0	82	41	1,808	1,274	3,205
8	0	41	329	4,150	2,630	7,150
9	0	82	329	6,205	3,863	10,479
10	0	82	205	4,233	3,616	8,136

Sensitivity Test Failed Fire Suppression						
One Percent Increase in Disturbance Probability						
Decade	GF	SS	IMM	MAT	OLD	Total
1	41	0	41	1,603	5,547	7,232
2	247	329	1,192	17,505	56,790	76,063
3	41	41	329	4,849	8,547	13,807
4	0	0	0	1,890	2,383	4,273
5	0	0	123	2,466	1,644	4,233
6	164	329	1,644	29,340	26,094	57,571
7	0	82	41	1,808	1,274	3,205
8	0	41	329	4,150	2,589	7,109
9	0	82	370	6,205	3,904	10,561
10	0	82	205	4,233	3,616	8,136

Percent Change in Results Resulting From 1% Change in Probability						
Decade	GF	SS	IMM	MAT	OLD	Total
1	1.0000	#DIV/0!	1.0000	1.0000	1.0305	1.0232
2	1.0000	1.0000	1.0000	1.0023	1.0036	1.0033
3	1.0000	1.0000	1.0000	1.0000	1.0048	1.0030
4	#DIV/0!	#DIV/0!	#DIV/0!	1.0000	1.0000	1.0000
5	#DIV/0!	#DIV/0!	1.0000	1.0173	1.0000	1.0100
6	1.0000	1.0000	1.0000	1.0014	1.0016	1.0014
7	#DIV/0!	1.0000	1.0000	1.0000	1.0000	1.0000
8	#DIV/0!	1.0000	1.0000	1.0000	0.9844	0.9943
9	#DIV/0!	1.0000	1.1246	1.0000	1.0106	1.0078
10	#DIV/0!	1.0000	1.0000	1.0000	1.0000	1.0000

Table B-2d. Sensitivity Test Results for Failed Fire Suppression.

Spruce-fir Initial Conditions Sensitivity Test Results					
Decade	GF	SS	IMM	MAT	OLD
0	6654	6654	12902	14626	95415
1	9038	7723	17915	26008	77950
2	11176	9490	23914	34719	60856
3	8134	11997	31228	41499	48980
4	2916	9490	41460	47787	42078
5	1602	4395	48447	54032	37352
6	2793	3368	51159	58879	30818
7	16805	3614	47460	60813	14915
8	1561	17421	43021	67222	15532
9	1109	2752	50953	72482	19723
10	12162	2341	41626	72361	14873

Table B-3. Initial Conditions Sensitivity Test Results.

Outcomes From the Modeling Process

The VDDT model projects a wide variety of outcomes from the different alternatives and other model formulations such as baseline and sensitivity runs. These outcomes can be used to gain an understanding and to discuss effects of the alternatives related to a wide range of resource areas and social/economic considerations.

National Forest Management Act (NFMA) regulations (36 CFR 219.12(f) (9)) require that each alternative indicate

- the conditions and uses that would result from long-term application of the alternative;
- the goods and services to be produced, and the timing and flow of these resource outputs together with associated costs and benefits;
- standards and guidelines for resource management; and
- the purpose of the proposed management direction.

Chapter 3 and Appendix B of the Environmental Impact Statement along with the Proposed Forest Plan meet the requirements as listed above for the NFMA.

Acres by Class by Cover Type

The formulation of the VDDT model is driven by how forested vegetation changes over time with and without management actions being applied. The primary output from the modeling for effects analysis is the acres of the different forest vegetation structures over

time by cover type. This information is critical for understanding habitat conditions for wildlife, insect and wildfire hazards, species composition, integrating ecological processes and predicting short- and long-term effects. Table B-4 displays sample output from the VDDT model. The change in acreage within the structural stages between decades reflects the effect of prescribed burning approximately 6000 acres each year.

Table B-4. Distribution of Overthrust Mountain Stable Aspen Acres Over 100 Years.

Decade	SS	IMM	MAT
0	0	844	101,038
1	55,894	6,236	37,804
2	6,885	67,521	23,904
3	1,234	73,822	21,890
4	30,269	38,519	26,307
5	37,869	37,317	18,058
6	7,210	72,328	16,304
7	1,072	73,530	19,227
8	54,985	23,644	19,032
9	14,290	66,774	14,745
10	2,079	79,798	12,504

Estimation of Allowable Sale Quantity (ASQ)

The sustainable level of timber harvest volume from suited acres is referred to as ASQ and the National Forest Management Act requires estimation of this outcome. Suited acres are defined by MPC and were discussed above.

Estimates of the timber volume generated from mechanical treatments on suited acres were included in the VDDT model to estimate ASQ. Yield estimates for the activities within Management Actions, discussed above, were the basis for determining ASQ. The objective of non-declining flow was included in all alternatives. Table B-5 displays the ASQ by Alternative for the Forest.

Estimation of Total Sale Program Quantity (TSPQ)

The level of timber harvest volume from forested acres is referred to as Total Sale Program Quantity and the National Forest Management Act requires estimation of this outcome. This total volume amount includes the ASQ.

Estimates of the timber volume generated from mechanical treatments on forested acres were included in the VDDT model to estimate the modeling portion of Total Sale Program Quantity (TSPQ). Yield estimates for the activities within Management Actions, discussed above, were the basis for determining the modeled portion of TSPQ. It is important to note that any volume in excess of the ASQ level is potential volume that is dependent upon other resource needs and would be offered only if opportunities arose,

and on an irregular basis. Table B-4 displays the model-generated portion of Total Sale Program Quantity by Alternative as calculated by VDDT. Additional volume estimates from salvage, post and poles, and firewood were added to the model estimates to determine the final amount of Total Sale Program Quantity in the Forest Plan.

Table B-5. ASQ And TSPQ Estimates From VDDT For All Alternatives In Millions Of Cubic Feet (mmcf) and Millions of Board Feet (mmbf)

Wasatch-Cache National Forest		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt.7
Allowable Sale Quantity	mmcf/yr	0	0	.3	.67	1.3	.40	.40
Allowable Sale Quantity	mmbf/yr	0	0	1.6	3.3	6.2	2.0	2.0
Total Sale Program Quantity	mmcf/yr	0	.4	.6	1.28	1.55	.81	.90
Total Sale Program Quantity	mmbf/yr	0	2.1	3.2	6.2	7.4	3.9	4.5

Sagebrush Modeling

A simple tool was used to model sagebrush succession by alternative. The following assumptions were made based on estimations of the rate of succession from low canopy cover (0-5%) to moderate canopy cover (6-15%), and from moderate canopy cover to high canopy cover (>15%). In addition estimations were made on the amount of juniper (and pinyon-juniper) communities that were historically maintained in a sagebrush stage of succession from historical, natural fires.

First, it was assumed that 90 percent of the acres treated in this type during any decade, were sagebrush communities with high canopy cover. Ten percent of the communities treated were juniper communities that now occur on what historically was dominated by sagebrush. Not all existing juniper communities occur on these sites. We estimate that 50 percent of the juniper communities occupy rocky sites that did not support sagebrush and did not have fine fuels to carry fire as frequently as those stands that did have sagebrush and associated fuels. An of the 50 percent that does currently occupy sites that are typically dominated by sagebrush, only half of those acres (19,225 acres) were maintained in a sagebrush state on a continuous basis.

It was also assumed that, on the average, sagebrush communities reach high canopy cover within 20 years of disturbance. And that in each decade, 50 percent of the moderate canopy cover moved into the high cover class stage. All treated acres would move to the low canopy cover stage.

Various biological, environmental, and management characteristics and factors play a role in sagebrush succession. An intrinsic variability in sagebrush communities is caused by the different habitats and life history of the 8-9 different sagebrush taxa that occur on the Forest. Silver sagebrush and spiked big sagebrush sprout following disturbance, while the others do not. Some, including low sagebrush and some mountain big sagebrush communities occur on rocky soils that naturally do not have a high amount of

fuels to adequately carry fire. Some stands have historically been overgrazed, which has resulted in low fuels and a subsequent inability to carry fires as historically occurred.

The following tables illustrate how this modeling was completed. Given the natural variability in these ecosystems and the probability that some assumptions are not correct, the results of these models are only indicators of how the different alternatives would affect change in the sagebrush type.

The desired condition for Sagebrush and for Pinyon-Juniper communities is as follows:

- Sagebrush: 208,800 acres
- Pinyon-Juniper: 57,700 acres

Currently there are 189,600 acres of sagebrush communities and 75,900 acres of pinyon-juniper communities. As noted above, of these p-j communities, approximately 50 percent occur on sites where sagebrush once was able to maintain dominance through frequent natural fires (every 20 to 30 years). And of these acres, with a 50-200 year fire frequency for p-j, it was assumed that only half of this was actually dominated by sagebrush (25% of total p-j acres or 19,225 acres) at any given time. It is these acres, in the desired condition (Forest Plan, Chapter 4) that are moved back toward dominance by sagebrush through actions (primarily prescribed fire). This model shows how those and the following desired conditions are addressed by alternative. It was assumed that 10% of the treatment acres (e.g. 1000 acres of 10000 acre treated - Alternatives 3 and 4) would focus on returning pinyon-juniper to sagebrush; that portion that historically was controlled by fire and dominated by sagebrush.

The desired condition for cover classes in sagebrush are as follows:

- Low Cover (0-5% sagebrush cover) = 5-15 percent of total acres
- Moderate Cover (6-15%) = 30-50 percent of total sagebrush acres.
- High Cover (>15%) = 30-50 percent of total sagebrush acres.
- Acres of P-J that should be Sagebrush = 0-5% of total acres

Table B-6. Existing and Future Condition of Sagebrush Cover Type by Alternative

Conditions	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing Condition							
Juniper and Pinyon-Juniper	76,900	76,900	76,900	76,900	76,900	76,900	76,900
Sagebrush	189,600	189,600	189,600	189,600	189,600	189,600	189,600
Total Acres of Sagebrush and PJ	266,500	266,500	266,500	266,500	266,500	266,500	266,500
Existing Condition							
Acres in Grass Forb Stage	9,480	9,480	9,480	9,480	9,480	9,480	9,480
Acres in Moderate Canopy Cover Stage	47,400	47,400	47,400	47,400	47,400	47,400	47,400
Acres in High Canopy Cover Stage	132,720	132,720	132,720	132,720	132,720	132,720	132,720
Acres that should be dominated by sagebrush that are dominated by juniper.	19,225	19,225	19,225	19,225	19,225	19,225	19,225
Total Acres of Sagebrush and PJ that should be dominated by sagebrush	208,825	208,825	208,825	208,825	208,825	208,825	208,825
Percent in Grass Forb Stage	5%	5%	5%	5%	5%	5%	5%
Percent in Moderate Canopy Cover Stage	23%	23%	23%	23%	23%	23%	23%
Percent in High Canopy Cover Stage	64%	64%	64%	64%	64%	64%	64%
Percent of sagebrush type that is dominated by juniper	9%	9%	9%	9%	9%	9%	9%
Acres Treated per decade	0	40,000	20,000	10,000	10,000	20,000	30,000
Decade 1							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	16%	16%	16%	16%	16%	16%	16%
Percent in High Canopy Cover Stage	75%	58%	66%	71%	71%	66%	62%
Percent of sagebrush type that is currently dominated by juniper	9%	7%	8%	9%	9%	8%	8%
Decade 2							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	8%	27%	18%	13%	13%	18%	22%
Percent in High Canopy Cover Stage	83%	48%	66%	74%	74%	66%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	5%	7%	8%	8%	7%	6%
Decade 3							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	4%	33%	18%	11%	11%	18%	26%
Percent in High Canopy Cover Stage	87%	45%	66%	76%	76%	66%	55%
Percent of sagebrush type that is currently dominated by juniper	9%	3%	6%	8%	8%	6%	5%
Decade 4							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	2%	36%	19%	10%	10%	19%	27%
Percent in High Canopy Cover Stage	89%	44%	66%	78%	78%	66%	55%
Percent of sagebrush type that is currently dominated by juniper	9%	2%	5%	7%	7%	5%	3%

Conditions	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Decade 5							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	1%	37%	19%	10%	10%	19%	28%
Percent in High Canopy Cover Stage	90%	44%	67%	78%	78%	67%	56%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	4%	7%	7%	4%	2%
Decade 6							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	0%	38%	19%	10%	10%	19%	28%
Percent in High Canopy Cover Stage	90%	43%	68%	79%	79%	68%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	3%	6%	6%	3%	1%
Decade 7							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	0%	38%	19%	10%	10%	19%	29%
Percent in High Canopy Cover Stage	91%	43%	69%	80%	80%	69%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	3%	6%	6%	3%	0%
Decade 8							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	0%	38%	19%	10%	10%	19%	29%
Percent in High Canopy Cover Stage	91%	43%	70%	80%	80%	70%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	2%	5%	5%	2%	0%
Decade 9							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	0%	38%	19%	10%	10%	19%	29%
Percent in High Canopy Cover Stage	91%	43%	71%	81%	81%	71%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	1%	5%	5%	1%	0%
Decade 10							
Percent in Grass Forb Stage	0%	19%	10%	5%	5%	10%	14%
Percent in Moderate Canopy Cover Stage	0%	38%	19%	10%	10%	19%	29%
Percent in High Canopy Cover Stage	91%	43%	71%	81%	81%	71%	57%
Percent of sagebrush type that is currently dominated by juniper	9%	0%	0%	4%	4%	0%	0%

APPENDIX B - 2

Terrestrial Wildlife Diversity and Viability

Introduction/Background

Diversity and viability of species are important factors that must be considered in Forest Plans. Their relationship and where they are covered in law and implementing regulations can be confusing. A draft of the "White Paper on Managing Viable Populations" (USDA 2000f) gives the following on diversity and viability and how they relate and are implemented in Forest Planning:

> "The National Forest Management Act (NFMA) and its implementing regulations require National Forests to provide habitat in order to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." (36CFR219.19). Forest Service manual direction extends this mandate to include vascular plants.
>
> "The NFMA regulations define a viable population as "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." The regulations direct that "habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area." The planning area is defined as the Forest Service lands included in the Forest Plan.
>
> "While NFMA regulations focus on species viability, the Act does not use the term "viability." Rather, it directs that management of National Forests "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." **(**NFMA Sec.6 (g)(3)(B) **)**. Thus, the viability of individual species must be considered within the context of overall diversity of plant and animal species, and the multiple-use objectives for the planning area."

Neither NFMA nor the 1982 Planning Regulations give direction on how to address viability. The draft White Paper On Managing for Population Viability (USDA Forest Service, 2002f) the relationship of Forest Service Viability Evaluations to Population Viability (PVA) is discussed. Viability evaluations center on ecological sustainability while PVA is species specific.

Our approach is based on changes in ecological characteristics of the landscape (e.g. ecosystem composition, structure and pattern rather than on demographic characteristics of individual species. Sufficient demographic information for assessing viability is not available for most species. An ecosystem, or coarse filter, approach is appropriate at Forest level scales. Such an approach is a recognized method for addressing issues of

biodiversity, species-community relationships, and insuring the replication of habitats across the forest scale that will include historic ecosystem processes. Kaufmann et al. 1994 states, "'The concept (coarse filter) assumes that a representative array of communities will contain the majority of species and that an array of cover types in an ecoregion will include the appropriate vegetation mosaic".

Ecological Context

The Wasatch-Cache National Forest falls within two provinces and 3 sections as described in "Ecological Subregions of the United States: Section Descriptions" (McNab, 1994). The majority of the Forest lies within the Southern Rocky Mountain Steppe – Open Woodland – Coniferous Forest – Alpine Meadow Province (Province M331). Within this province, Forest lands are included in two sections, the Overthrust Mountain (Section M331D) and the Uinta Mountains (Section M331E). The Stansbury Mountains fall in Section 341A (Bonneville Basin) of the Intermountain Semi-Desert and Desert Province.

The Overthrust Mountain Section consists of the southern portion of the Bear River Range and the Wasatch Range. The section is made up of steep rugged mountains with narrow to broad valleys. Active fault lines still exist, especially on the Wasatch Range. Kuchler vegetation types include lodgepole pine-subalpine forest, and Douglas-fir forest with outer fringes of sagebrush steppe. Mountain mahogany-oak scrub surrounds Douglas-fir forest. Vegetation types depend on a combination of altitude, latitude, slope, exposure and prevailing winds. Apline tundra at the highest elevations come down to the subalpine zone with spruce-fir forests, the montane zone with ponderosa pine and Douglas-fir forests, and on down to the sagebrush type at the lower elevevations. Faunal species including bison, bighorn sheep, and large carnivors such as the gray wolf and grizzly bear have been extirpated from the Section due mostly to the activities of man. Bighorn sheep have since been reintroduced to some areas. Other fauna typical of the Section include elk, mule deer, moose, cougar, and black bear. Habitats within the Section support a diverse avifauna of migratory birds, waterfowl, and grouse species. There are also a variety of amphibians, reptiles, and invertebrates.

The Uinta Mountain Section consists of the north and western slopes of the Uinta Mountain Range (the south and eastern slopes are administered by the Ashley National Forest). The Uintas were formed by an anticlinal uplift and are the largest east-west running range in the United States. Glacial processes have done much to form the present mountain range at higher elevations along with freezing, thawing, water erosion, and wind at all elevations. Vegetation types, from higher to lower elevations, include alpine tundra, Englemann spruce, spruce-fir, lodgepole pine, subalpine meadow, Douglas-fir, aspen, mountain big sagebrush, oak and mountain brush, pinyon-juniper, Wyoming big sagebrush, and desert shrub. The oak is generally found on the western portions of the range with pinyon-juniper and sagebrush steppe on the eastern portion. Big game animals include elk, mule deer, moose throughout the area, and antelope at lower elevations. Bighorn sheep have been reintroduced and mountain goats have been introduced. Grizzly bear have been extirpated. Lynx and wolverine, if they still exist are in very low numbers. Other predators include cougar, black bear, coyote, bobcat, red fox

and pine marten. The diverse habitats support a diverse avifauna of migratory birds, some waterfowl, and grouse species including the white-tail ptarmigan. Many species of raptors use the area including red-tailed hawks, northern goshawk, harriers, kestrel, great horned owls, and golden eagles. Bald eagles winter at lower elevations.

The Stansbury Range is in the Bonneville Basin Section (341A) of the Intermountain Semi-Desert and Desert Province. The Stansburys are one of several ranges in the province running north-south which are separated by broad sediment filled valleys. The range was formed by faulting and erosion has been a main factor if forming their present character. Large alluvial fans have formed at the mouths of most canyons. Elevations in the province are generally between 4,000 and 8,000 feet, although Deseret Peak tops out at 11,031 feet. Vegetation types include desert shrub, shrub-grass, and woodland vegetation. Woodlands consist of juniper-pinyon especially on the west side and south end of the range. The eastern slope is dominated by sagebrush at lower elevations, with aspen and Douglas fir on the higher sites. The area evolved to support bison, antelope, desert bighorn sheep, mule deer, large populations of lagomorphs and sage grouse. Major predators included grizzly bear, cougar, wolves, and coyotes. Grizzly bear, wolves, desert bighorn, and bison have been extirpated. None have been reintroduced to the Stansbury Range. Elk have moved into the Range. Many species of avifauna use the area. Besides the neotropical migrants, there are peregrine falcons, goshawks, golden eagles, wintering bald eagles and other raptors.

Process

We defined species-at-risk (SAR) as, “Federally listed endangered, threatened, candidate, and proposed species and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk may include sensitive species and state listed species.”

Species at risk are not management indicator species but species of concern that the Forest will watch as groups in relation to habitat changes. For most of the species the Forest will work with other agencies in gaining more information on presence and distribution.

For the purpose of identifying species-at-risk the Forest used the following definition:

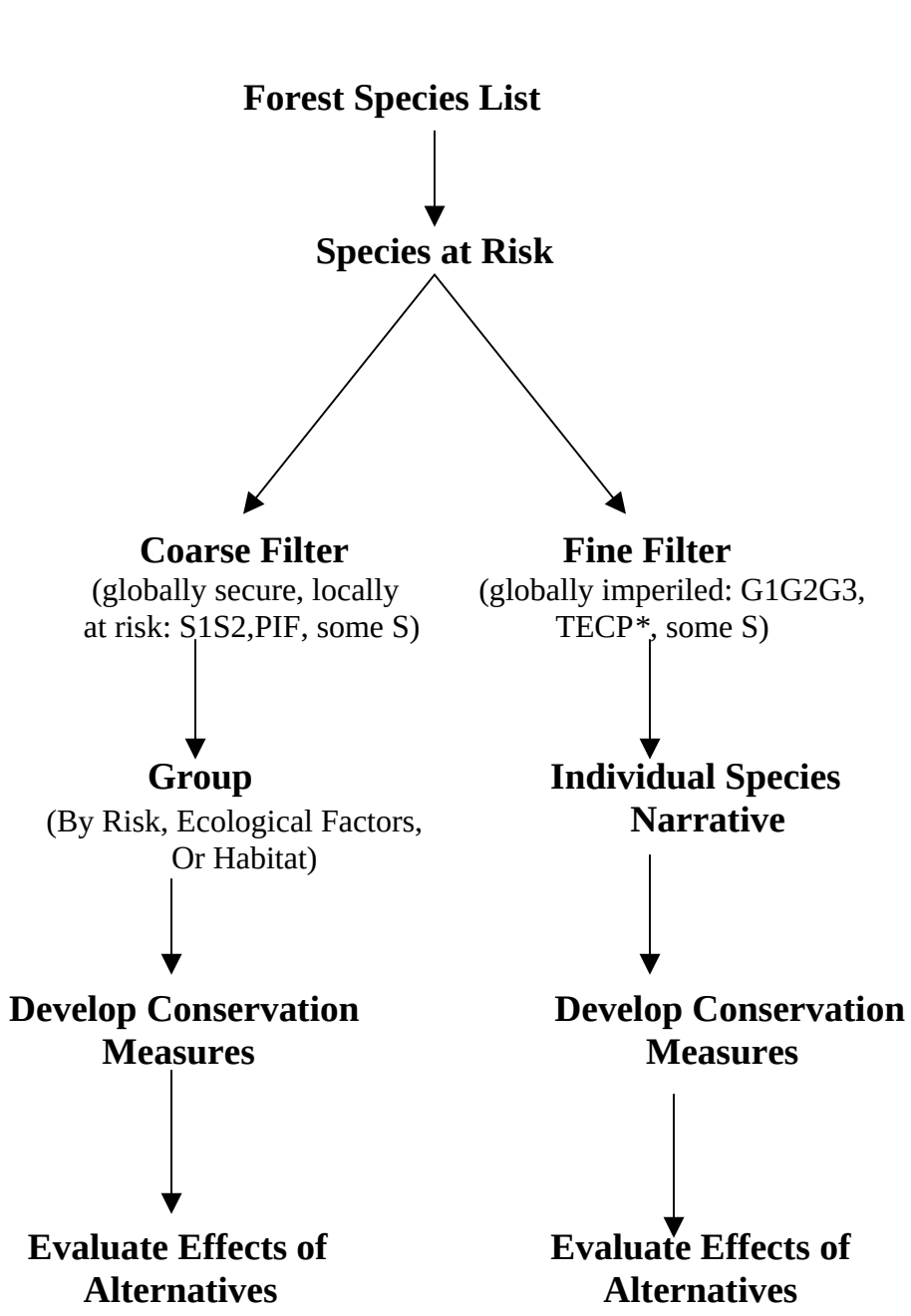
> For the Wasatch-Cache Plan revision the term “species-at-risk includes:
> -Fish and Wildlife Service endangered, threatened, candidate, proposed species.
> -Regional Forester designated sensitive species.
>
> Also considered for inclusion as species-at-risk were species identified by:
> -The Nature Conservancy as G1, G2, and G3.
> -State Natural Heritage programs as S1 and S2.
> -Partners In Flight species of concern.
> -The Forest that do not appear on any other lists.

In some cases species may not be considered at-risk. Some species listed as S1 or S2 should be more appropriately addressed as species that may be at risk, but little is known about their distribution patterns or abundance. For these species, the emphasis will be to work with states and other governmental agencies to gather additional information relative to their rarity, habitat associations and other information.

Species for which viability is of concern were identified using the following lists: Federally Listed and Proposed (P), Endangered (E), Threatened (T), and Candidate (C) Species And Habitat in Utah by County (USDI 2002b); the Utah State Sensitive Species List and Natural Heritage Database (UDWR 1998a, 200*2*) considering S1 and S2 and G1, G2, and G3 species as ranked by the Utah Natural Heritage Program and the Nature Conservancy; the Intermountain Region Forest Service Sensitive Species List (USDA 1994b); the Wyoming Species of Special Concern (Wyoming, 2001), and the Utah *and* Wyoming Partners in Flight Priority Species List (UDWR 1999a, Wyoming 2001). For consideration in analysis, the species listed were then evaluated for potential habitat or occurrence on the Forest, and for any known historic or current sightings. Only species on or in close proximity to the Wasatch-Cache NF are addressed in this paper. For all species, maps were generated from the Utah Natural Heritage Database program (UDWR 200*2*), if available. For descriptions of rankings, refer to the referenced list. It is also noted that the Natural Heritage Database is not exhaustive, and that other species occurrences are known and were considered. Only rare species were considered as it was assumed that species that were either more abundant or generalists in terms of habitat requirements would not be of a concern from a viability perspective. A list of species to be considered was generated as follows, and includes their relevant rankings. Viability for plants, and aquatic vertebrates was analyzed under separate processes and are included in the project file for the Revised Forest Plan. A total 68 species including 32 species of invertebrates, 2 amphibians, 3 reptiles, 22 birds and 9 mammals are listed for the Wasatch-cache National Forest.

The SAR were then divided into coarse filter species and fine filter species. Fine filter species are those that are tracked individually. In general, these included the globally imperiled species that have been labeled as G1, G2, G3, Federally listed E, T, C, P species, and some Forest Service Sensitive species. Coarse filter species were grouped by the vegetation or habitat type that they are associated with so that common goals, standards and guidelines can be used for the species group. The final step in the process is to identify monitoring that is practical and within expected budgets to track the species or species groups. The figure below illustrates the process.

Figure B2 – 1. Terrestrial Species Viability Process



*Two candidate species have been included in the coarse filter. These are the mountain plover and yellow-billed cuckoo. The reasoning is that so little of their habitat exists on Forest and they are covered in detail in BA's for proposed projects within their habitats.

VERTEBRATES

Species-at-Risk

The species in the following table have been identified as SAR from the Forest vertebrate species list which contains about 300 species including 30 fish, 6 amphibians, 18 reptiles, 74 mammals, and 190 birds using the criteria discussed under process, above. Fish and amphibians are covered in Appendix B3 and plants are covered in Appendix B4.

Table B2 – 1. Vertebrate Species at risk for Viability

Species Common Name	Primary Habitat on Wasatch-Cache NF	Federal Ranking	State (UT/WY) Ranking	Global Ranking
Reptiles				
Common gartersake	Generalist, near water	None	UT S2S3	G5
Milksnake	Generalist	None	UT S2S3	G5
Rubber boa	Generalist	None	UT S2S3	G5
Birds				
Bald eagle	Cottonwood Riparian	Threatened	UT Threatened; WY S2BS3N	G4
Black rosy finch	Alpine	None	UT PIF	G5
Black swift	Waterfalls/Canyons	None	UT PIF, S1	G4
Boreal owl	Spruce/fir	FS Sensitive	WY S2	G5
Brewer's sparrow	Sage Steppe	None	UT PIF WY S3B,SZN	G5
Broad-tailed hummingbird	Riparian/Aspen/ Mountain shrub	None	UT PIF	G5
Evening grosbeak	Conifer/Aspen	None	UT S2	G5
Flammulated owl	Aspen/Conifer	FS Sensitive	UT S3S4	G4
Gray Catbird	Lowland Riparian	None	UT S2	G5
Lewis' woodpecker	Ponderosa Pine/ Mixed Conifer	None	UT PIF,S2	G5
Mountain plover	High plains and arid regions	Proposed Threatened	UT S1BSZN WY S2BSZN UT,WY PIF	G2
Northern goshawk	Conifer/Aspen	FS Sensitive	UT S3 WY S23B,S4N	G4

Osprey	Riparian	None	UT S1S2B	G5
Peregrine falcon	Canyons/Cliffs	FS Sensitive*	UT Endangered WY S2N	G4
Sage grouse	Sage Steppe	None	UT S2	G5
Sage sparrow	Sage Steppe	None	UT PIF WY PIF	
Sandhill crane	Riparian	None	UT S1	G5
Sharp-tailed grouse	Native shrub- grassland	FS Sensitive	UT S1S2	G4
Three-toed woodpecker	Spruce-fir/Conifer	FS Sensitive	UT S2,PIF WY S3	G5
Virginia's warbler	Mountain Shrub	None	UT PIF WY S2B,SZN	G5
Williamson's sapsucker	Conifer/Aspen	None	UT PIF,S2	
Yellow-billed cuckoo	Moderately dense thickets and woods	Candidate	UT SHB	G5
Mammals				
Dwarf shrew	Alpine/scree	None	UT S1 WY S2S3	G4
Fringed myotis	Caves/Mountain shrub	None	UT S2	G5
Idaho pocket gopher	Shallow rocky soils	None	UT S1S2 WY S2?[1]	G4
Canada Lynx	Conifer	Threatened	UT S1 WY S1	G5
American Pine marten	Conifer	None	UT S2	G5
Townsend's big-eared bat	Caves/Riparian	FS Sensitive	UT S2	G4
Western red bat	Caves/Riparian	None	UT S1	G5
Western small-footed myotis	Caves/Mountain shrub	None	UT S2	G5
Wolverine	Tundra/Coniferous Forest	FS Sensetive	UT S1	G4

* = Recently delisted from threatened under ESA, considered as FS sensitive.

Many of the species listed are widespread in areas outside of the Forest and Utah, and thus may not be affected by other management practices and threats.

[1]? = unknown

Species Groups (coarse filter)

Species selected as species of concern from a viability perspective were grouped into habitat associations. Groupings were selected to facilitate an ecosystem sustainability or landscape scale approach. Table B2-2 indicates habitats used by the species with the primary habitat analized shown with the letter "P."

Some species, such as the American redstart, whose range has been found to be a fringe area on the Forest have not been included in detail as a group member. Habitat and individuals will benefit and be protected through standards and guidelines that affect other species within the group.

Table B2- 2 Species-at-Risk and Habitats Used

Species	Aspen	Tall Forb	Riparian	Aquatic	Sage Steppe	Alpine	Snags	Caves/ Mines	Conifer	Pinyon/ Juniper	Waterfall Cliffs	Generalist
Black rosy finch						P						
Black swift											P	
Boreal owl	X		X				X		P			
Brewer's sparrow					P							
Broad-tailed hummingbird	X	P	X									
Evening grosbeak									P			
Flammulated owl	P		X				X		X			
Gray catbird	X		P									
Lewis' woodpecker	X		X				P		X			
Mountain plover					P							
Osprey			X	P								
Peregrine falcon			X								P	
Sage grouse			X		P							
Sage sparrow					P							
Sandhill crane			P									
Sharp-tailed grouse					P							
Three-toed woodpecker							P		X			
Virginia's warbler										P		
Williamson's sapsucker							P		X			
Yellow-billed cuckoo			P									
Dwarf shrew						P			X			
Fringed myotis			X					P		X	X	
Idaho pocket gopher					P							
American pine marten							X		P			

Townsend's big-eared bat			X				X	P				
Western red bat							X	X	P			
Western small-footed myotis			X				X	P				
Wolverine	X	X	X			X			P			
Common gatersnake												P
Milksnake												P
Rubber boa												P

Coarse Filter Vertebrate Species/Habitat Summaries

Aspen

Flammulated owl (*Otus flammeolus*) G4, UT-S3,S4. Becoming increasingly common as surveys increase, this is an S3S4 species and originally listed as sensitive with the Region 4 USFS list (USDA Forest Service, 1994b). Known to occur on the Wasatch-Cache through project surveys, primarily using aspen and conifer stands with snags. Insectivorous species. Threats would be from loss of snags or from nesting disturbance.

Tall Forb

Broad-tailed hummingbird (*Selasphorus platycercus*) G5, UT-PIF. Utah is near the northern extent of the breeding range, and the species is common to Utah. It winters primarily in Mexico. It nests primarily in riparian and adjacent habitats (aspen and oak) both in lower valleys and higher elevations, with nests above ground. Feeds on nectar of wildflowers. Though common throughout the west, the species may be in decline in Utah (UDWR, 1999a). Threats to this species would include loss of riparian habitat and lack of wildflowers, among others.

Riparian

Gray catbird (*Dumetella carolinensis*) G5, UT-S2. Known to north-central Utah, nesting in riparian shrubs and trees from 4,500 to 7,000 feet. Utah is the far western edge of the species' occurrence (Peterson 1990). It feeds on insects and seeds/fruits (USDA Forest Service, 1991). It is likely that loss of riparian habitat may be of concern for this species.

Sandhill crane (*Grus canadensis*) G5, UT-S1. This is a common migrant in parts of northern Utah, especially along the Green River. Nesting is restricted to a few locations. They are more frequent at lower elevations in cultivated fields. They are dependent on secure nesting cover in wide-open riparian meadows. Predation and nest disruption is a common problem with the species.

Yellow-billed cuckoo (*Coccyzus americanus*) C, G5, UT-S1,S2B; WY-S2B,SZN. This species is rare in the state. In northern Utah it is listed in Weber, Salt Lake, and Utah Counties. It breeds in riparian zones in streamside or cultivated trees and willows in lower valleys and canyons (UDWR 1998d, 2002). All Natural Heritage sites are at or below forest boundaries, and use of the Wasatch-Cache is likely to be incidental if at all. Utah is the far western edge of its breeding range (Peterson 1990). Because of the limited habitat on Forest and protection given to riparian areas this species is best followed in the coarse filter.

Aquatic

Osprey (*Pandion haliaetus*) G5, UT-S1,S2B. They have been observed nesting at Pineview Reservoir and Tea Pot Lake on the Wasatch-Cache NF. Future use on the Forest may occur if populations continue to expand, or if nesting platforms are developed.

Sage Steppe

Brewer's sparrow (*Spizella breweri*) G5, UT-PIF; WY-S3B,SZN. Occurs in shrub steppe habitats in the western U.S., particularly in the Great Basin area. The species winters in the southwest U.S. and into Mexico. It nests in the mid canopy of dense sagebrush stands, and consumes insects in the summer, seeds in the winter. Considered to be common and strongly viable in Utah (UDWR 1999a), but in a downward trend range-wide. Loss of sage steppe habitat is considered the main threat to the species.

***Sage sparrow (Amphispiza belli*)** UT-PIF, WY-PIF. Requires sagebrush and chaparral habitats with scattered bushes. Often found in and among the bushes in the Great Basin and other dry desert areas (USDA Forest Service, 1991).

Sage grouse (*Centrocercus urophasianus*) G5, UT-S2. Small populations occur in sagebrush areas of the Wasatch-Cache (UDWR 2002). This species is of concern throughout the west. Occupies sage steppe ecosystems. Threats regionally are from loss of sage habitat, while locally predation may be more of concern.

Mountain plover (*Charadrius montanus*) G3, UT-S1B,SXN; WY-S2B,SZN; UT and WY-PIF. This species occurs in the Uinta Basin east of the Forest, but has not been known to occur on or near the Forest (USGS Biological Survey, 2000, UDWR 1998a,d, 2002). The main habitats would be along the Wyoming/Utah border where it is tied to the high plains sage steppe and short prairie grasslands of Wyoming. Because this is a fringe species on the Forest it has been carried forward in the coarse filter.

Sharp-tailed grouse (*Tympanuchus phasianellus*) G4, UT-S1,S2. Known only to northern Utah, with historic locations on or near the Wasatch-Cache (UDWR 2002). The species habitat consists of grasslands and sage steppe.

Idaho pocket gopher (*Thomomys idahoensis*) G4, UT-S1,S2; WY-S2?. The species has a restricted range in Idaho, Wyoming and Utah. There are three locations on the Ashley. There are also locations near the Wasatch-Cache. Usually found in shallow rocky soils, but one specimen in Rich County was in deep soils near a stream (UDWR 1998d). Threats in Utah are not known.

Alpine

Black rosy-finch (*Leucosticte atrata*) G5, UT-PIF. Common breeder in the mountains of the western U.S., with Utah being the southern limit. The bird winters in the same general area, but at lower altitudes. Primarily feeds on seeds of alpine plants, with some insects. Nests in cliffs or rock talus slopes. There are no perceived management threats to this species (UDWR 1999a).

Dwarf shrew (*Sorex nanus*) G4, UT-S1; WY-S2,S3. This species appears to be rare, and is suspected to occur throughout the Wasatch and Uinta Mountains (UDWR 1998d, 2002). Known to occur on the Wasatch-Cache NF in the high Uinta Mountains. The main part of the species range is in Wyoming, Colorado, and New Mexico, with a little in Arizonia (Burt & Grossenheider 1976). It is typically found at higher elevations and prefers alpine tundra, subalpine coniferous forests, and usually subalpine rockslides. No known threats are likely from management activities due to the elevation range and lack of management disturbances.

Snags

Lewis' woodpecker (Melanerpes lewis) G5, UT-S2,PIF. Occurs in all but eight counties in Utah, the species is generally uncommon (UDWR 1998a,d). Primarily known to occur in ponderosa pine forests (southern Utah), and is closely tied with occurrences of fire, but also inhabits mixed conifer, oak communities, and riparian woodlands. They feed on insects in the breeding season, nuts and berries in the winter. Utah is at the southern end of breeding habitat for the species, and it winters in the southwest U.S. (UDWR 1999). Threats would be from loss of fire created landscapes and loss of snags.

Northern three-toed woodpecker (*Picoides tridactylus*) G5, UT-S2,PIF; WY-S3. Known to occur on the Wasatch-Cache through project surveys. Utah is near the southern end of its range, though it occurs through the eastern U.S. and also in Europe and Asia (Peterson 1990, UDWR 1999a). Nests in cavities of trees and is associated with the spruce beetle in the spruce-fir communities, feeding primarily on these insects, and stays in its territory year-round. Threats include loss of cavities and a reduction in prey if insect outbreaks are curtailed.

Williamson's sapsucker (*Sphyrapicus thyroideus*) G?, UT-S2,PIF. This is an uncommon summer resident in Utah, but occurs throughout most of the mountainous areas. Known to the Rocky Mountain states, and the interior coastal ranges of the western U.S. (Peterson 1990). They have been found in montane riparian woodlands as well as coniferous forests and aspen-conifer mixes (UDWR 1998a,d). Drills holes in trees to extract sap and the insects it attracts, nesting in cavities (USDA Forest Service, 1991). Threats are from loss of snags for cavities.

Caves/Mines

Fringed myotis (*Myotis thysanodes*) G5, UT-S2. The species is widely distributed in Utah with most references being in southern Utah. The bat occurs throughout the western U.S. (Burt & Grossengeider 1976). There are 4 locations in Cache County on or near the Forest. The habitats where the fringed myotis has been found include caves, mines, rock crevices and buildings in the pine, oak, pinyon-juniper and desert shrub communities (UDWR 2000a). Unsurveyed and/or unprotected roosts in caves and/or mines would be at risk.

Townsend's big-eared bat (*Plecotus townsendii*) G4, UT-S2. This species is moderately common in the state, and occurs on the Wasatch-Cache (UDWR 2000a). It is known to occur throughout the western U.S. and branching into the east (Burt & Grossengeider 1976). Caves and old mines are their main roost areas. Unsurveyed and/or unprotected roosts in caves and/or mines would be at risk on the Wasatch-Cache.

Western small-footed myotis (*Myotis ciliolabrum*. Formerly *Myotis subulatus* and *Myotis leibii*) G5, UT-S2. Occurs statewide in at least 18 counties, and throughout the western U.S.. It may inhabit the Wasatch-Cache NF in Salt Lake, Weber and Cache Counties (UDWR 2000a). The species uses montane forest and woodlands which includes Douglas fir, quaking aspen, pinyon pine, rocky mountain juniper, Gambel's oak, and black sagebrush. They have also been found in ponderosa pine and white fir. Roosting occurs in abandoned mines and caves. Unsurveyed and/or unprotected roosts would be at risk on the Forest. Winter roosts are likely in caves.

Conifer

Boreal owl (*Aegolius funereus*) G5, WY-S2. Utah is the far southern range of this species, which is associated with boreal forests in North America. It is a cavity nesting species, and preys largely on red-backed voles which require old growth type habitat in spruce-fir (USDA Forest Service 1994d). Its presence has been confirmed on the Wasatch-Cache through project surveys, and there are likely a few breeding pairs. Threats include loss of old growth habitat or nesting disturbance.

Evening grosbeak (*Coccothraustes vespertinus*) G5, UT-S2. Thought to be a rare breeder in the Uinta and Wasatch mountains in spruce-fir habitats, common throughout the state and the western U.S. as a migrant and wintering species (Peterson 1990, UDWR 1998d). Eats primarily seeds and insects, nesting in conifer branches 20 to 100 feet above ground (USDA Forest Service 1991). No known habitat limitations or threats occur on the Wasatch-Cache.

American pine marten (*Martes americana*) G5, UT-S2. This species is located in the Uinta and Wasatch mountains (UDWR 1998a,d). It is thought to be in decline due to loss of habitat and over-trapping. It relies on coniferous forests at higher elevations using old growth structure for primary denning and foraging sites (USDA Forest Service 1994c). Loss of old growth forest structure would be of concern. The marten is known to occur throughout boreal forests in North America (Burt & Grossengeider 1976).

Western red bat (*Lasiurus blossevillii*) G5, UT-S1. This is the rarest bat in Utah. It is known from about 5 locations, one of which is on the Wasatch-Cache (Providence Canyon). (UDWR 2000a). The species seems to prefer wooded areas. It roosts in trees, but occasionally will enter caves. It is not clear what habitat is lacking, if any, on the Wasatch-Cache. Unsurveyed and/or unprotected roosts in caves and/or mines would be at risk on the Wasatch-Cache, and possibly snags.

Wolverine (*Gulo gulo*) G4, UT-S1. Historically known to occur in Utah. May be present in the Wasatch Mountains, and the Uinta Mountains with occasional reports persisting (UDWR 1998a,d, 2002). The species is associated with montane coniferous forests. This species is more fully analyzed in the Biological Evaluation that accompanies the Revised Forest Plan. It has been sighted in the Rocky Mountain and coastal mountains, and is most prevalent in the Arctic and Canada (USDA Forest Service 1994c). Human disturbance to habitat may be of concern, but threats are not well understood.

Pinyon/Juniper

Virginia's warbler (*Vermivora virginiae*) G5, UT-PIF; WY-S2B,SZN. Utah is near the northern extent of the breeding range (southwest U.S.) for the species, and it winters primarily in Mexico (UDWR 1999a). Habitat includes oak canyons, brushy slopes and pinyon-juniper. This species is a more common ground nester. It is primarily insectivorous. Threats to this species are largely unknown, possibly from cowbird parasitism, predation, or loss of habitat. Downward trends are not well documented.

Waterfalls/Cliffs

Black swift (*Cypseloides niger*) G4, UT-S1,PIF. This species is associated with waterfalls where it nests in colonies, and feeds on insects caught in the air. It is

known to occur on the Uinta at the Bridal Veil falls, near Aspen Grove, and likely near Stewart Falls by Aspen Grove and near Scout Falls near the Timponeeke campground (UDWR 1999a, Webb 2000). On the Wasatch-Cache they occur at Doughnut Falls. A loss of water flow, or human disturbance at nest sites would be the primary threats to the species.

Peregrine falcon (*Falco peregrinus*) G4, UT-Endangered; WY-S2N. Historically occurred on the Wasatch-Cache along the Wasatch front canyons (UDWR 2002), it still is found in some locations and has potential to occur in more. The speicies was recently delisted from the federal endangered species list due to species recovery throughout the west following alterations in pesticide use. Habitat on the Wyoming portion of the Forest is limited, but the species may use or migrate through the area. Threats would be from nest disruption.

Habitat Generalists

Milksnake (*Lampropeltis triangulum taylori*) G5, UT-S2,S3. Listed as occurring in north-central Utah (Stebbins 1985). Known as a secretive snake from lowlands into the mountains, preying on reptiles and small mammals. The Utah subspecies is an isolated population from the more contiguous occurrence in the eastern U.S. Threats are unknown for this species, though collection is often a concern and threat with reptiles.

Common gartersnake (*Thamnophis sirtalis*). G5, Ut-S2,S3 .This species is found in many environments including grassland, woodland, scrub, and forest (Stebbins 1985). It lives near water. In Utah it is generally found at lower elevations on the Wasatch Range and western Uintas.

Rubber boa *(Charina bottae*). G5, UT-S2,S3. Frequents grassland, woodland, and forest (Stebbins 1985). Can be found under rotting logs, rocks, and the bark of fallen and standing dead trees. Historically the species has been found scattered across the forest.

Fine Filter Vertebrate Species/Habitat Summaries

Species used in the fine filter are those for which conservation strategies are available and then the discussion is still more towards the vegetation and habitats they use. Two candidate species that fit the fine filter definition have been put into the coarse filter category. These are the mountain plover that is a short grass prairie species and the yellow-billed cuckoo that uses low elevation riparian shrub and deciduous trees. Habitat for these two species is so limited on the Forest that it is not logical to deal with them at the fine filter level. Measures to protect habitat for these species are covered in the coarse filter discussion and they will also be discussed in the biological assessment (BA).

The three species carried into the fine filter include two for which there are conservation strategies and agreements and one for which there is a recovery plan.

Bald eagle (*Haliaeetus leucocephalus*) G4, UT-Threatened; WY-S2B,S3N. The bald eagle is a wintering species in Utah and southwestern Wyoming. In recent years four pair have again begun nesting in Utah (USDI USFWS 2002b). None of these are on National Forest lands. None are known to nest in Uinta County, Wyoming along the Utah/Wyoming border. They primarily occupy cottonwood dominated riparian areas. Threats would be from roost disturbance or loss of winter habitat. They are common in the U.S. and being considered for delisting.

Northern goshawk (*Accipiter gentilis*) G4, UT-S3; WY-S23,S4N. Occurs across the state in conifer-aspen forests. Where literature states that the number of populations is, "probably more than 20 and perhaps fewer than 100 occurrences," surveys on NFS lands over the past several years have identified many more nest sites – probably 300-400 (UDWR 1998a,b). Known to nest in several areas on the Wasatch-Cache NF. Threats would be from loss of habitat or nest disruption. A Conservation Assessment was conducted for Utah (Graham et al. 1999), showing an abundance of potential habitat and listing several management recommendations that have been incorporated into the Revised Forest Plan. A common breeder to the Rocky Mountain states and Canada, while wintering in the plains states and lower elevations of western states.

Canada lynx (*Lynx canadensis*) G5, UT-S1; WY-S1. This federally threatened species occurred historically on the Wasatch-Cache throughout spruce-fir habitats, however none have been sighted in recent years. Utah would be the far southwest extension of the species' range. A Conservation Agreement and Strategy have been developed for the species, based on a Conservation Assessment that was recently completed (Ruediger, 2000). Hair-snare surveys for the species were conducted using the national protocol in 1999, 2000, 2001 with no hits from the lynx. Brigham Young University is also conducting a forest carnivor study on the Uinta Mountains on both the Ashley and Wasatch-Cache National Forests. Their extensive networks of hair snares which also follow the national protocol have been negative in 2000 and 2001. Their third year of transects will be completed in 2002. The negative results do not indicate that the lynx does not exist on the Forest but does indicate that the probability is very low. Threats are from development, competition for prey from other species, and loss of denning and foraging habitat.

Risks

Conservation approaches are tied to risks associated to a vegetation type and species group in the coarse filter and to individual species or their habitat in the fine filter. Conservation and management efforts for bald eagles are tiered to the Pacific States Bald Eagle Recovery Plan. Conservation measures for the lynx are adapted from the work being done in Montana by the Lynx Amendment Team and will be published as the Northern Rockies Lynx Amendment. Goshawk conservation measures are adapted from the Wasatch-Cache Forest Plan Amendment (March, 2000i). Conservation measures for

all species are contained in the standards and guidelines of the Forest Plan. Risks by vegetation type or habitat are listed in Table B2-3.

Table B2 – 3. Ecosystems and Risks

	Grazing	Succession	Developed Sites	Displacement	Fire Suppression	Logging	Roads	Water Development	Pesticides	Fragmentation	Non-Native Plant Invasion
Aspen	X	X	X		X		X				X
Tall Forb	X		X				X				X
Riparian	X	X	X				X	X	X		X
Aquatic	X		X	X		X	X	X	X		
Sage Steppe	X	X	X		X		X			X	X
Alpine	X				X						
Snags			X	X	X	X			X	X	
Caves/Mines			X	X			X		X		
Conifer		X	X		X	X	X		X	X	X
Pinyon/Juniper	X		X	X	X		X				X
Waterfalls/Cliffs			X	X					X		
Generalists	X			X	X	X	X			X	

Risks to vegetative communities or habitats used by identified species-at-risk

Tall Forb Community.
The tall forb community is listed as primary habitat for only one species, the broad-tailed hummingbird. The Forest contains 3,200 acres of the tall forb community. The major risk to this community is grazing by mountain goats. At this point mountain goat populations are not of a size that evidence of damage to the tall forb community has been observed. Monitoring of the tall forb community will provide the information needed for documentation. As populations reach the desired herd size identified by the Utah Division of Wildlife Resources they will be controlled through hunting. Hunting already takes place on a limited basis on all mountain goat units at the present time.

Wet Meadow Community.
The sandhill crane is listed under the wet meadow community. There are 16,900 acres of wet meadow on the Forest. For the most part the sandhill crane passes through Utah during spring and fall migrations. There are some that remain in the state during the summer but the State of Utah lists their breeding status as S1 which means there are typically 5 or fewer occurrences or very few remaining individuals or acres. Standards and guidelines for wetlands provide protection needed for the sandhill cranes that use the area.

Bottomland Hardwoods and Willows.
This is the primary habitat of the yellow-billed cuckoo that has recently been listed as a candidate species by the U.S. Fish and Wildlife Service. The State lists the species as a historical breeder in the State. The Forest has 39,400 acres of bottomland hardwoods and willow that are protected by standards and guidelines for riparian areas and grazing.

Aquatic.
The osprey has been listed under the aquatic heading because of its dependence of aquatic habitats for foraging. Many of these areas are off Forest but those on Forest are protected by standards and guidelines with no proposed changes in management that would affect these species.

Sage Steppe.
Species included under the sage steppe community are Brewer's sparrow, mountain plover, sage grouse, sage sparrow, sharp-tailed grouse and Idaho pocket gopher. The mountain plover is mostly a short grass prairie species. There is little, if any, of this habitat on the Forest along the Wyoming border but we have included the species because of it's proposed threatened status under the Endangered Species Act. The sharp-tailed grouse is only considered in appropriate habitat in Cache, Box Elder, and Weber Counties. The Idaho pocket gopher if present is found along the Wyoming border. There are 189,600 acres of sage steppe habitat on the Forest. This is an area where habitat manipulation could take place under the Revised Plan. Table B2 – 8 shows the amount of possible treatment under each alternative. The table includes treatments in sagebrush and pinyon-juniper and comes from Table VEG – 4 in Chapter 3 of the FEIS.

Pinyon-Juniper.
Pinyon-juniper is the primary habitat of Virginia's warbler. There are 76,900 acres of pinyon-juniper on the Forest. Pinyon-juniper treatments are possible under the revised plan. They are included with the sage steppe for planning purposes and are covered in Table B2 – 8.

Table B2 – 8 Possible Treatment in Sage Steppe, Pinyon-Juniper

Sage Steppe/ Pinyon-Juniper	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Prescribed burns	0	40,000	20,000	10,000	10,000	20,000	30,000
Total area in sage, pinyon-juniper type	266,500 acres						
% of area that could be treated in 10 year period	0%	15%	8%	4%	4%	8%	11%

Alpine.

The black rosy finch and dwarf shrew use the alpine areas on the Forest. There are 19,700 acres of this habitat present. The Uinta Mountains are the areas where these species occur in the Alpine habitats. There are no habitat manipulation projects that would take place in the habitats of these species.

Snags.
The Lewis' woodpecker, three-toed woodpecker, and Williamson's sapsucker are snag dependent species that are listed at risk. Snag management is a concern Forest-wide in appropriate tree species and a guideline in the Revised Plan identify the densities they should occur in.

Caves/Mines.
Townsend's big-eared bat, fringed myotis, and western small-footed myotis are dependant on caves and mines. There is a Revised Plan standard that prohibits blocking the free ingress or egress from caves and mines. Caves and mines are evaluated on an case by case basis to determine the need to restrict public access.

Aspen and Conifer.
This category includes all combinations including conifer aspen, aspen conifer, aspen, mixed conifer, spruce-fir, lodgepole pine, Douglas fir, and ponderosa pine. There are 660,100 acres of this combination of species on the Forest. Species-at-risk that depend on aspen and conifer include boreal owl flammulated owl, gray catbird, western red bat, American pine marten, and wolverine. Many of these species depend more on the mature/old growth age classes while others depend more on the younger age classes. The Forest does not have a complete mapping of age classes but is working towards that end. Table B2 – 9 indicates the possible acreages of treatment by alternative to show what changes in age class could occur over a 10 year period and the miles of road that would be needed for timber harvest.

Table B2 – 9 Possible Treatments in Aspen and Conifer

Timber Treatments	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Prescribed Burns Aspen, Aspen/Conifer	0	80,000	32,000	7,200	7,200	32,000	32,000
Acres Prescribed Burns Douglas Fir	0	4,000	2,000	0	0	2,000	2,000
Acres Timber Harvest Aspen, and Conifer	0	6,500	7,500	12,500	15,500	5,000	8,500
Total Treatment Acres	0	90,500	41,500	19,700	22,700	39,000	42,500
Total Acres of Aspen and Conifer	660,100						
% of Area That Could Be	0%	14%	6%	3%	3%	6%	6%

Treated in 10 Year Period							
New Timber Harvest Road Construction (miles)	0	6	39	49	49	6	7

Waterfalls/Cliffs.
The black swift nests behind waterfalls where there are no management activities taking place. The species on the Wasatch-Cache falls into the category of an inherently rare species in that low numbers are due to the rarity of habitat and not on any management activity. The peregrine falcon nests on high cliffs again where there are not active management activities. If peregrines are found in areas where climbing is popular closures will be considered.

Habitat Generalists.
The common gartersnake, mildsnake, and rubber boa have been found at most elevations in the Forest and in many different habitats. The discussion above on all vegetation types and habitats speak to these generalist species.

Persistence

The National Forest Management Act (NFMA) and its implementing regulations require National Forests to provide habitat in order to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area." (36CFR219.19).

The NFMA regulations define a viable population as "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area." The regulations direct that "habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

Table B2 – 10 summarizes the above discussions and notes the effects of Alternative 7 on the groups. With the low amount of management on the Forest that alters habitats it is felt that all species-at-risk will persist through the next planning period. Table B2-10 does show that seven species listed as being able to persist through the planning period with a "qualified" yes. These species were sandhill crane, yellow-billed cuckoo, bald eagle, mountain plover, sharp-tailed grouse, Canada lynx, and wolverine. The qualified "yes" was given because there is no evidence that these species are present with the "estimated numbers and distribution of reproductive individuals to ensure its continued existence…". These species are not present because their life histories or natural ranges do not include adequate areas of the Forest. The Forest does, however, have the habitat, that in conjunction with habitat adjacent to the Forest could "support, at least, a minimum number of reproductive individuals…" Habitat will be maintained to meet the law

although the possibility of having a reproductive population is very low. The rationale for each species is listed below.

Sandhill crane. The main population of sandhill cranes passes through Utah on spring/fall migrations. There is minimal breeding in the State. There are no historical or present breeding known to be taking place on the Forest. The birds use agricultural areas more than any other habitat in the State. Riparian and other areas that the birds may use on the Forest will be protected through standards and guidelines in the Revised Plan.

Yellow-billed cuckoo. The State of Utah lists the species as historically breeding in the State. Occurrences in the State are very sporadic and have been single birds in a given year for the past several occurrences. Lowland riparian shrub and deciduous tree habitats will be protected through standards and guidelines in the Revised Plan.

Bald eagle. There are four known nesting pairs of bald eagles in the State and none are on National Forest System lands. There is no historic record of them nesting on the Wasatch-Cache National Forest. Roost areas on the Forest will be protected.

Mountain plover. The mountain plover has never been documented on the Forest. Habitat on the Forest along the Wyoming border is limited and a viable reproducing population would depend more on adjacent lands where the Forest does not have control. Habitats need to be mapped and will be protected through standards and guidelines in the Revised Plan.

Sharp-tailed grouse. The sharp-tailed grouse is occasionally seen on or adjacent to the Forest but the Forest is on the fringes of the species habitat and would add little to the habitat needed for a viable reproducing population. Habitats need to be mapped and will be protected through standards and guidelines in the Revised Plan.

Canada lynx. The FWS, State of Utah, and Forest Service have not been able to document the presence of lynx through surveys done over the past three years. Habitat is present to maintain a viable population but unless Utah became part of a reintroduction plan presented by the FWS there will likely never be a viable population in the State.

Wolverine. Wolverine are occasionally reported in Northern Utah but even with surveys in those areas they have not been confirmed. Habitat is present to maintain a viable population but unless there were to be a reintroduction effort this probably will not happen.

For the other species-at-risk Forest plan management direction set forth in the Desired Future Conditions, goals, objectives, management prescriptions, standards and guidelines, when considered with other influences such as the projected flat budget, and the level of management activity (see discussions above) and the goal of managing for PFC persistence will be maintained through the next planning period.

Table B2 – 10 Effects of Management

Species	Primary Habitat	Primary Age Class Used	Current Amount (acres)	Projected % Change in Age Class Over 10 Years Under Alternative 7	Persistence Over 10 Years	Assumptions
Broad-tailed hummingbird	TF	N/A	3,200	0	Yes	Biggest threat to habitat is grazing by mountain goats.
Sandhill crane	WM	N/A	16,900	0	Yes[1]	Species most often just migrating through.
Yellowbilled cuckoo	BH,WI	N/A	39,400		Yes[1]	Species is not known to nest in Utah.
Bald eagle	Aquatic	N/A	N/A	N/A	Yes[1]	See discussion of aquatic protection in Appendix B3.
Osprey	Aquatic	N/A	N/A	N/A	Yes	
Brewer's sparrow	Sage Steppe	Mature/Old	189,600	Sagebrush and pinyon-juniper total 226,500 acres. Under Alternative 7 30,000 acres could be treated in 10 years. This is **11 %** of the total.	Yes	
Mountain plover	Sage Steppe, Short grass	Young	189,600		Yes[1]	
Sage grouse	Sage Steppe	All	189,600		Yes	
Sage sparrow	Sage Steppe	?	189,600		Yes	
Sharp-tailed grouse	Sage Steppe	?	189,600		Yes[1]	
Idaho pocket gopher	Sage Steppe	?	189,600		Yes	
Virginia's warbler	Pinyon/ Juniper	?	76,900		Yes	
Black rosy finch	Alpine	N/A	19,700	0	Yes	
Dwarf shrew	Alpine	N/A	19,700	0	Yes	
Lewis' woodpecker	Snags	N/A	N/A	N/A	Yes	Snag and dead down woody debris guideline will ensure proper snag densities.
Three-toed woodpecker	Snags	N/A	N/A	N/A	Yes	
Williamson's sapsucker	Snags	N/A	N/A	N/A	Yes	

Townsend's big-eared bat	Caves/ Mines	N/A	N/A	0	Yes	Cave and mine standard will ensure protection of cave and mine dependent species.
Fringed myotis	Caves/ Mines	N/A	N/A	0	Yes	
Western Small-footed myotis	Caves/ Mines	N/A	N/A	0	Yes	
Boreal owl	CA,AC	Mature/Old	205,600	All aspen, aspen/conifer mixes, and straight conifer on the Forest total 660,100 acres. Under Alternative 7 42,500 acres could be treated through fire or timber sales. This is **6%** of the total acreage.	Yes	
Flammulated owl	AS,CA,AC	Mature/Old	205,600		Yes	
Gray catbird	SF,MC,LP,CA AC,DF,PP	?	557,300		Yes	
Northern goshawk	SF,MC,LP,CA AC,DF,PP	Mature/Old	557,300		Yes	
Western red bat	SF,MC,LP,CA AC,DF,PP	Mature/Old	557,300		Yes	
Canada lynx	SF,MC,LP,CA AC,DF,PP	All	557,300		Yes[1]	
American pine marten	SF,MC,LP,CA AC,DF,PP	Mature/Old	557,300		Yes	
Wolverine	SF,MC,DF	Mature/Old	292,700		Yes[1]	
Black swift	Waterfalls/ Cliffs	N/A	N/A	0	Yes	Nests behind waterfalls where no management activities are planned.
Perigrine falcon	Waterfalls/ Cliffs	N/A	N/A	0	Yes	Nests on high rugged inaccessible cliffs with no planned management activities.
Common gartersnake	Generalist	N/A	N/A			
Milksnake	Generalist	N/A	N/A			
Rubber boa	Generalist	N/A	N/A			

[1] A qualified yes. See discussion under persistence.

AC – Aspen/Conifer
AS – Aspen
BH – Bottomland Hardwood
CA – Conifer/Aspen
DF – Douglas Fir
LP – Lodgepole Pine
MC – Mixed Conifer
PP – Ponderosa Pine
SF – Spruce/Fir
TF – Tall Forb
WI – Willow
WM – Wet Meadow

Cumulative Effects

The Forest plan identifies what activities might occur during the planning period but does not indicate exactly where they will occur except in the general context of management areas and prescriptions where the activities are allowed. Cumulative effects will vary due to the individual needs and habitat of individual species and impacts from resource uses outside the Forest. Cumulative effects to wildlife are also based on the cumulative effects described for vegetation, watersheds, and aquatic resources, in their respective sections in this chapter.

Past impacts have included commercial and firewood harvest of timber. While structure within some forested stands has been altered, mature overstory canopies have remained due to a lack of clearcutting (except in lodgepole) or other such even-aged management methods in coniferous stands. Current harvesting methods and those planned for use in the future are of uneven aged methods in conifer stands except lodgepole pine, and even-aged methods in aspen stands.

Temporary changes in habitat may be evident through vegetation management or similar type non-permanent disturbances. Commercial timber, prescribed burning and wildland fire (including wildland fire use) are methods used for these temporary changes. These treatments would meet requirements for residual habitat components such as snags, dead and down material, and landscape structure. It is not likely that these activities in combined total would affect any of the wildlife SAR to the point where viability is compromised beyond current conditions. With the Forest adhering to the most current and preventative measures available for managing habitat, the cumulative effects to the species are anticipated to be minimal as a result of management activities proposed in all alternatives. Old growth would be retained to meet the planned requirement identified in the Revised Plan guidelines.

Livestock grazing has caused the loss of some forb communities and altered the understory of forested communities and the structure of shrub and grass/forb communities. However, grazing levels (in terms of number of livestock and use levels) have been greatly reduced from earlier decades.

Livestock grazing and associated soil loss has altered watershed conditions and aquatic habitats for many species. While management is planned to alter these conditions and prevent any future impacts, recovery may not occur at a rate substantial enough to affect a change in the long term, particularly in terms of vegetative conditions. Watershed and fisheries projects are designed to improve these habitats.

The lack of younger seral conditions are of concern from a diversity of habitat standpoint. Management directed at striving for PFC of vegetation communities would provide improved habitat for many species.

Prescribed fire, wildland fire use, and mechanical (commercial harvest or other methods) methods would be used to diversify structural stages in all alternatives, although it is not

anticipated that the level of activity proposed would bring the communities within PFC within the next several decades due to the inability to treat enough habitat, which is in part due to other resource concerns (e.g. air quality) and in part due to funding. With alternatives that do not allow or significantly limit timber harvest these treatments may become dependent on prescribed fire and wildland fire use

Alternative 5 could increase the potential level of resource commodities. Alternative 1 would maximize the trend toward passive resource preservation, rather than active management, carrying both positive and negative implications for wildlife.

Potential habitat disturbances can be summarized by the number of acres disturbed through typical management activities. While development of roads and campgrounds was much greater through the 1960's, it is not anticipated that the rate of increase will be that great in the future. In addition, some acres of habitat may be gained if roads are decommissioned, however this is an unknown level at this time.

Species with unknown distributions and threats, such as the wolverine and marten, may have more specific management direction applied should ongoing and recent studies and assessments indicate a need for listing them under the Endangered Species Act. There are also potentials for immigration from other listed species, such as the wolf, into the Wasatch-Cache NF.

Introductions of non-native wildlife species, which is largely outside of Forest Service control, have the potential to increase cumulative effects through diseases or through resource competition. In all introductions the Forest Service has the responsibility to work cooperatively with the State to assess habitat and potential impacts.

For wildlife species that are subject to hunting or trapping (e.g. big game and beaver), state regulatory mechanisms are responsible for the sustainability of these populations, and directly affect the ecology of managing these species. Should severe winters occur, effects would be more severe on big game species due to the reduction in amount and quality of winter range, primarily off Forest.

Regional risk trends for many species of wildlife are due to trends started during past heavier exploitative uses of habitat. While recovery is slow, it is perceived to be occurring for some habitats and species, although the loss of other habitats in areas being developed or converted to annual grasses and invasive weeds is also of regional concern for many species, both on the Forest and adjacent to it.

While cumulative impacts within the Forest may affect some species, the implementation of goals, objectives, standards and guidelines are expected to conserve existing habitat and improve habitat for some of these species. By managing within the range of historic variation and properly functioning condition it is expected that all species will be sustained in the long term.

Lands Adjacent to National Forest

On lands outside the National Forest, most of the activities with the potential to negatively affect terrestrial and aquatic resources are outside of Forest Service jurisdiction, such as aquatic diversions and urban development. The cumulative effects for wildlife resources considers land within the Forest boundary, but takes into consideration the private, state, other National Forest, and BLM lands adjoining it as wildlife do not recognize property boundaries. The trends of a predominance of mature vegetative conditions occur similarly on adjoining federal and state lands, largely due to similar fire suppression practices. The value of habitat on the Forest would continue to be of higher importance as private land adjoining the Forest is developed in the future. The similar management methods on the Uinta National Forest to the south, the Ashley National Forest to the east, and the Caribou National Forest to the north provide assurance on the maintenance of suitable wildlife habitat and connectivity of forested habitats, although similar concerns on lack of young seral conditions exist.

With the predicted expansion of urban areas adjacent to the Forest, and on inholdings within it, the value of the Forest as a biological reserve will continue to escalate. Urban areas will exert the most influence on the Forest, through fire suppression needs and risks, through expansion of noxious weeds and other undesirable or non-native vegetation species, and through the increased user demand for recreation on the Forest. Urban expansion and development on private in-holdings within the Forest have the potential to increase fragmentation and reduce connectivity of habitats. Similar impacts are anticipated in winter range areas because of their lower elevations and development. These expansions would not likely affect old growth conditions.

Concern is generated should trends of increased use of water diversions and increased recreation demands continue, carrying an associated risk of population declines and potential risks in viability depending on the needs of individual species. Similar trends are anticipated on National Forests and BLM lands adjacent to the Wasatch-Cache.

Fragmentation/Connectivity

“Fragmentation” of habitat on the Forest is naturally occurring in many areas, especially the overthrust belt and the western Uinta Mountains, as is evident viewing the vegetation map. In these areas there is a high degree of dispersion of native vegetative communities, rather than more contiguous or larger blocks of continuous forest canopy. The exception to this is in the Uinta Mountains in the lodgepole, mixed conifer, spruce-fir vegetation type. No conversion or loss of vegetation types has occurred to increase fragmentation at a large scale on the Forest. The high degree of mosaics was likely historically present, however likely represented by more structural diversity within vegetative communities. Smaller-scale habitat fragmentation has occurred primarily through the development of a network of roads and small recreation site developments within the Forest. Although a loss of habitat has occurred historically due to these developments, effects on fragmentation are minimal. Loss of some species such as the lynx, wolf, grizzly bear was

due to harvesting/trapping and competition from other predators, rather than an increase in habitat fragmentation.

Connectivity of habitats at this point has mostly been compromised through development of urban areas adjacent to the Forest. Other than paved highways and small utility corridors, the Forest remains largely intact from its original composition.

The maintenance of the forested corridor of connectivity along the Wasatch range north to Idaho and Wyoming, south to the Uinta NF and east to the Ashley NF is important. Private land use is the greatest threat to this corridor. Corridor use is important for wide ranging species such as neo-tropical migratory birds, raptors, and for larger bodied mammals that are capable of dispersing across many miles.

For some species, such as neo-tropical migratory birds and wide-ranging carnivores, impacts from far off-site areas such as deforestation in Central America or urban expansions in the northwest and western U.S. may have far greater effects on fragmentation and viability than those of Forest management activities both on the Wasatch-Cache and neighboring lands.

Strategy

Coarse Filter Species

Coarse filter species will be tracked through the monitoring of habitat changes caused by other resource uses and natural disturbance events (e.g. fire).

Fine Filter Species

Canada lynx. The Canada Lynx Conservation Assessment and Strategy (Ruediger, 2000) lists three inventory and monitoring needs for the lynx. First, is inventory and monitoring of lynx distribution. This includes delineating distribution through the collecting of hair samples (McKelvey et al. 1999). This process has begun on the Forest. Hair-snare surveys for the species were conducted using the national protocol in 1999, 2000, 2001 with no hits from the lynx. Brigham Young University is also conducting a forest carnivor study on the Uinta Mountains on both the Ashley and Wasatch-Cache National Forests. Their extensive networks of hair snares which also follow the national protocol have been negative in 2000 and 2001. Their third year of transects will be completed in 2002.

Second, is inventory and monitoring of lynx habitat conditions. This includes habitat (denning and foraging) quality and distribution, and effects of major risk factors such as recreational activities that cause snow compaction.

Third, is monitoring and validation of conservation measures outlined in the strategy.

Northern goshawk. The goshawk has been identified as a management indicator species in the Revised Forest Plan and monitored as identified in Chaper 4 of the Plan.

Bald Eagle. Utah and the Wasatch-Cache National Forest were not included in the FWS Recovery Plan for the bald eagle. For the most part the species is only a winter visitant to the State (in the past few years four pair have begun nesting in Utah at lower elevations around sources of abundant prey). The Forest will work with the UWDR and FWS in monitoring wintering eagles.

Vertebrate Species Not Carried Forward

Although not carried forward for the reasons stated below if the species occasionally uses the Forest it would have the needed habitat components because of actions and circumstances identified above and the implementation of standards and guidelines in the Revised Forest Plan.

Birds:

American Redstart (*Setophaga ruticilla*) G5, Ut-S2B,SZN. Historically known as a rare breeding species occurring at lower elevations on the Provo River (UDWR 1998d, 2002). Utah is the far southern edge of the species range (Peterson, 1990). It is considered native and natural with presence confident regionally in the Uinta and Wasatch Mountains. The species is found in riparian vegetation, especially willows, deciduous trees of valleys and low canyons, and may use aspen-conifer stands (USDA Forest Service 1991). Brown-headed cowbirds are a problem in riparian areas.

American avocet (*Recurvirostra americana*) UT-PIF. This species is closely associated with the Great Salt Lake wetlands and is an incidental visitor to the Forest, if at all (Peterson 1990).

American white pelican (*Pelecanus erythrorhynchos*) G3, UT-S1B. The species is present because of the wetlands around the Great Salt Lake and Utah Lake (UDWR 1998a,d). Use of lakes on the Forest is incidental.

Black-necked stilt (*Himantopus mexicanus*) UT-PIF. Occurs in Utah in connection with Great Salt Lake wetlands habitats. (UDWR 1999a).

Black tern (*Chlidonias niger*) G4, UT-S2B. It is a localized breeder in northern Utah at Utah Lake, Great Salt Lake, Pelican Lake and the Green River below NFS lands. Its use of the Forest is incidental, if at all (UDWR 1998a,d).

***Black-throated gray warbler (Dendroica nigrescens*).** UT-PIF. Inhabits conifer forests that are open and interspersed with shrubs or forest edges. In Utah it

prefers pinyon/juniper and scrub oak. Nesting elevations are from 4,000 to 7,000 feet (UDWR 1999a).

Bobolink (*Dolichonyx oryzivorus*) UT-PIF. Utah is the southern edge of the species range. Its main habitats are hayfields and meadows. Its use of the Forest is incidental, if at all. Breeding may occur in the Heber and Kamas valleys (UDWR 1999a).

Common loon (*Gavia immer*) G5, UT-SZN. The common loon occurs in Utah as an uncommon migrant and winter visitor. A few individuals remain through the summer, but there is no evidence of breeding (UDWR 1998d).

Grasshopper sparrow (A*mmodramus savannarum*) G5, UT-S1B. Known to northwest and eastern Utah, with little habitat potential on the Wasatch-Cache due to dry grassland habitat required. They are or were an incidental visitant to the Forest (UDWR 1998a,d).

Gray vireo (*Vireo vicinoir*) UT-PIF. The species is found primarily in southern Utah (UDWR 1999a).

Great gray owl (*Strix nebulosa*) G5, UT-SAN. This is an irregular winter visitant to Utah and may be in response to harsh winters north of Utah (Peterson 1990, USDA 1991, UDWR 1998d). The one report of a summer resident bird may represent post-breeding wandering

Green heron (*Butorides virescens*) G5, UT-S1B,SAN. Inhabits low elevation marshes, not known to occur on the Wasatch-Cache NF (UDWR 1998d).

Least bittern (*Ixobrychus exilis*) G5, UT-S1B. This species is tied to the Great Salt Lake and Utah Lake (UDWR 1998d). Use of the Forest is incidental if at all.

Long-billed curlew (*Numenius americanus*) G5, UT-BCP; WY-S3B,SZN. This is a high plains, rangeland species associated with wetlands. In winter it uses cultivated lands and salt marshes. Occurrences in Utah are tied closely to the Great Salt Lake wetlands and Utah Lake (UDWR 1998a,d, 2002). Habitat on the Wyoming portion of the Forest is marginal, at best. Use of the Forest is incidental.

Purple martin (Progne subis). G5, Ut-S2,S3B, WY-S2B,SZN. Open water near farms and meadows.

Snowy plover (*Charadrius alexandrinus*) G4, UT-S2,S3B. This species is known to occupy wetland sites, primarily associated with Utah Lake and the Great Salt Lake (UDWR 2002). Use of the Wasatch-Cache NF would be incidental, if at all.

Swainson's Hawk (Buteo swainsoni). UT-S3B,SRN, WY-PIF. Prefers prairies and large open valleys.

Trumpeter swan (*Cygnus buccinator*) G4, UT-S1N,SHB?. Associated with Great Salt Lake wetlands and use of the Wasatch Cache would be incidental, if at all (UDWR 1998d).

Veery (*Catharus fuscescens*) G5, UT-S2B. Known to occur in northern Utah, which is the southern edge of the species' breeding range (UDWR 1998d, Peterson 1990). Migrates to southeast U.S. for the winter. Requires moist woodlands or riparian woodlands with understories of shrubs, likely lower elevations in Utah. Nests on the ground or in low shrubs (USDA 1991).

Whooping crane (*Grus americana*) E, G1, UT-SEN. This species is not native to Utah. Birds migrating through Utah between winter and summer range are from an artificially established population (UDWR 1998d). Use of the Forest is incidental, if at all.

Mammals:

Black-footed ferret (*Mustela nigripes*) E, G1, UT-S1; WY-S1. Known only from eastern Utah. Habitat potential on the Wasatch-Cache is in Rich and Summit counties at lower elevations along the Wyoming border. The FWS lists Rich and Summit Counties as "historical" range (USDI USFWS 2002b). The Forest Service manages little or no habitat for the species in Wyoming.

Brown (grizzly) bear (*Ursus arctos*) T, G4, UT-SX. The species formerly ranged throughout Utah except for barren areas such as parts of the west desert. It is extirpated in the state, the last known animal being killed in the Bear River Range above Logan in the `1930's (UDWR 1998a,d, 2002; USDI USFWS 2002b).

Dark kangaroo mouse (*Microdipodops megacephalus*) G5, UT-S2. Known to occur in Tooele County (UDWR 2002). Its habitat is fine gravelly soils from 4,400 to 5,400 feet. Known to the Great Basin, Tooele County is the eastern most range of this species.

Fisher (*Martes pennanti*) G5, UT-SR; WY-S1. The species has been historically reported in the state by tracks in the Trial Lake area but it is questioned whether it really existed historically or if it does today (UDWR 1998a,d, USDA Forest Service 1994c, Burt & Grossenheider 1976). If it did occur, habitat would include montane forests, with denning sites in old growth type stands.

Gray wolf (*Canis lupus*) E, G4, UT-SX; WY-S1. The species formerly used the entire state, except possibly the barren areas of the west desert. Extirpated earlier in the 20th century (UDWR 1998a,d). It may return through the expansion of the packs from the Greater Yellowstone area, and planning for the species return is currently being conducted by the U.S. Fish and Wildlife Service. This species and its habitat would be managed through the endangered species process in conjunction with the U.S. Fish and Wildlife Service.

Northern river otter (*Loutra canadensis*) G5, UT-S1,S2; WY-S3. The species has been reported on all three Forests in northern Utah over time. There are reports from the '50's, '70's, and '80's. Other reports from southern Utah are from the Colorado River. The species is rare in the state and populations are low (UDWR 1998a,d, 2002). Habitat does exist on the Forest in Wyoming.

Preble's shrew (*Sorex preblei*) G4, UT-S1; WY-S1,S2. Tooele County is listed as habitat for this species, in desert springs, bogs, and marshes (UDWR 1998a, 2002). No locations are known to the Wasatch-Cache NF, although potential habitat may occur in the Stansbury's. Loss of habitat would be of concern.

Ringtail (Bassariscus astutus) G5, UT-S3; WY-S2. Relatively common to Utah. Tends to seek rocky country with cliffs and rock outcrops near water. No known habitat threats, but possible population threats from potential animal damage control and trapping. Utah is the northern most extension of its range as it is common throughout the southwest (Burt & Grossenheider 1976).

Skull Valley pocket gopher (*Thomomys bottae robustus*) G5, UT-S2. This subspecies is known from one population in Skull Valley, Tooele County (UDWR 2002). They were first recorded in 1946 and Natural Heritage has no record since.

Spotted bat (*Euderma maculata*) G4, UT-S2; WY-S1. Utah is in the center of the species range. The spotted bat inhabits arid country and occasionally enters buildings and caves. Most occurrences in the state are in the southern portions. The closest occurrence to the Wasatch-Cache was a female that was collected off of a school at 4800 South Redwood Road in Salt Lake City in 1934 (UDWR 2002, Burt & Grossenheider 1976).

Wyoming ground squirrel (*Spermophilus elegans*) G5, UT-S2,S3. The species is known from about 7 locations in Rich, Summit, and Daggett Counties. None are on NFS lands. Habitat consists of greasewood, and sagebrush areas, in open areas along roadsides, and along the margins of irrigated farmland and meadows (UDWR 1998a,d, 2002).

INVERTEBRATES

Invertebrates were selected from the Utah Natural Heritage database (UDWR 2002). Because of the lack of distribution knowledge all invertebrates close to the Forest are included in the chart. If it has been determined that a species probably does not exist on the Forest it is removed from further consideration in later narrative.

Table B2 – 11. Federal, State, and Global Ranking of Invertebrates

Species Common Name	Primary Habitat on Wasatch-Cache NF	Federal Ranking	State (UT/WY) Ranking	Global Ranking	Analysis Groupings
Aquatic snails					
Fossaria rustica	Aquatic	None	UT S1S2	G5	Aquatic
Glass phsya	Aquatic	None	UT S2	G5	Aquatic
Green River Pebblesnail	Aquatic	None	UT S2	G2	Aquatic
Lance aplexa	Aquatic	None	UT S2?	G5	Aquatic
Mountain marshsnail	Aquatic/riparian	None	UT S2?	G3	Aquatic
Pygmy fossaria	Aquatic	None	UT S1S2	G5	Aquatic
Rocky Mountain Duskysnail	Aquatic	None	UT S1	G3G4	Aquatic
Terrestrial Snails					
Amber glass	Riparian, Spruce/Fir	None	UT S2?	G5	Riparian, Spruce/Fir
Black gloss	Riparian	None	UT S1	G5	Riparian
Crestless column	Riparian	None	UT S2	G5	Riparian
Cross snaggletooth	Riparian	None	UT S1	G?	Riparian
Cross vertigo	Riparian	None	UT S2	G5	Riparian
Deseret mountainsnail	Oak/Maple, on limestone	None	UT S2	G2	Oak/Maple
Lyrate mountainsnail	Limestone, mt.brust/maple/sage	None	UT S2?	G2G3	Generalist
Mellow column	Riparian	None	UT S2?	G?	Riparian
Mill Creek mountainsnail	N facing slopes, moist coniferous forests	None	UT S1	G1	Generalist
Mitered	Aspen/Conifer	None	UT S2?	G?	Generalist

vertigo					
Wasatch mountainsnail	Oak/Maple on limestone	Candidate	Ut S1	G2	Oak/Maple
Mussels					
Western pearlshell	Aquatic	None	UT SH	G4	Aquatic
Insects					
American emerald	Springs/Bogs	None	UT S2	G5	Aquatic
Black meadowhawk	Wet grassy areas	None	UT S2?	G5	Aquatic
Bleached skimmer	Spring fed ponds and springs	None	UT S1S2	G3	Aquatic
Boreal whiteface	Lakes and wet meadows	None	UT S1	G5	Aquatic
Dot-tailed whiteface	Lakes and ponds	None	UT S1S2	G5	Aquatic
Hudsonian whiteface	High elevation lakes	None	UT S1?	G5	Aquatic
Lake darner	High elevation lakes	None	UT S1S2?	G5	Aquatic
Mountain emerald	High elevation lakes	None	UT S2	G5	Aquatic
Pacific spiketail	Clear shady foothill and mt. streams	None	UT S1S2	G5	Aquatic
Red-waisted whiteface	High elevation lakes	None	Ut S1?	G5	
Spangler's hydroporus diving beetle	Aquatic	None	UT SH	GH	Aquatic
Taiga bluet	Aquatic	None	UT S2?	G5	
Zigzag darner	Aquatic	None	UT S1S2	G5	Aquatic

Invertebrates Species Considered:

Most of the work on invertebrates on the Wasatch-Cache, and in Utah in general, was done prior to the 1950's. Just the lack of knowledge of life cycles, habitat needs, presence and distribution makes it impossible to put meaningful conservation measures in place. It also does not lend itself well to assign a state ranking to these species. At present the Forest relies on surrogate measures such as grazing and riparian guidelines, and properly functioning condition for conservation.

The need for basic baseline information on invertebrates dictates a coarse of inventory to document presence and distribution of species, and then a program of monitoring, and the development of conservation measures.

The one exception to this approach is with the Deseret mountainsnail (*Oreohelix peripherica wasatchensis*). This subspecies is a candidate for Federal listing. The only know population is on a parcel of land approximately 40 acres in size that is in three ownerships (Federal – Forest Service, the city of Ogden, and private). The Forest, working through Weber State University, has a recent inventory and Conservation Assessment for the species (Meadows, 2000) and a Conservation Strategy is being developed. Genetic work is also being done to determine if O.p. *wasatchensis* is indeed a distinct subspecies.

Aquatic Snails

Fossaria snail (*Fossaria rustica*) G5, UT-S1,S2. Known from Utah Lake and other localities, including streams off of the Forest. Habitat may be present on the Wasatch-Cache, but none of the species are known to occur. Surveys are needed to determine if it is extant in Utah and if so its distribution and abundance (UDWR 1999b, 2002). Hovingh (2000) indicated the species is quite common.

Glass physa (*Physa skinneri*) G5, UT-S2. The known locations of this species are from the Wasatch-Cache NF and from southern Utah (UDWR 1999b, 2002).

Green River pebblesnail (*Fluminicola coloradoensis*) G1,G2, UT-S1?. The species has been identified in Blacksmith's Fork and on the Weber River close to the Forest boundary (UDWR 1999b, 2002). Hovingh (personal communication, 2000) indicates the species is abundant north of the Provo River in the Upper Weber River and Bear River.

Lance aplexa (*Aplexa elongata*) G5, UT-S2?. Known from Ogden Canyon and other locations near the Forest (UDWR 1999b, 2002).

Mountain marshsnail (*Stagnicola montanensis*) G3, UT-S2?. Has been identified on Beaver Creek of the Logan Ranger District. (UDWR 1999b, 2002).

Pygmy fossaria (*Fossaria parva*) G5, UT-S1,S2. Historical records from northern Utah, show the species in the Bountiful area in Davis county and Fort Union area of Salt Lake County (UDWR 1999b, 2002). Fresh water streams at low elevations appears to be habitat. Hovingh (2000) again indicates the species is quite common.

Rocky Mountain duskysnail (*Colligyrrus greggi*) G3,G4, UT-S1. Two locations are known in Cache County (UDWR 1999b, 2002).

Terrestrial Snails

Amber glass (*Nesovitrea electrina*) G5, UT-S2?. This snail may use a variety of habitats in Utah, from spruce-fir moist areas to lower elevations, and may exist on the Wasatch-Cache (UDWR 1999b, 2002).

Black gloss (*Zonitoides nitidus*) G5, UT-S1. This terrestrial species is reported historically on the banks of streams, and has been found on the Blacksmiths Fork River, Ogden Canyon and Bell's Canyon, (UDWR 1999b, 2002).

Crestless column (*Pupilla hebes*) G5, UT-S2. Known from 10 historic locations in Utah, the closest is in Little Cottonwood Canyon on the Wasatch-Cache NF (UDWR 1999b, 2002). The species is associated with litter under deciduous trees (Hovingh, personal communication, 2000).

Cross snaggletooth (*Gastrocopta quadridens*) G?, UT-S1. Known from 2 locations in the state, the closest on the Wasatch-Cache NF, in Lamb's Canyon (UDWR 1999b, 2002).

Cross vertigo (*Vertigo modesta*) G5, UT-S2. Historically reported in Bell's Canyon, Lamb's Canyon, Weber Canyon, and Ogden Canyon. The terrestrial species may be associated with swampy ground (UDWR 1999b, 2002).

Deseret mountainsnail (*Oreohelix peripherica*) G2, UT-S2. The closest populations of this type are on the Wasatch-Cache NF in oak/maple and limestone outcrops and boulder fields. (UDWR 1999b, 2002). The race *O.p. wasatchensis* is a federal candidate for possible listing.

Lyrate mountainsnail (*Oreohelix haydeni*) G2,G3, UT-S2?. There are 5-6 locations on the Wasatch-Cache, with other locations near the Forest. A terrestrial species occupying limestone outcrops in shrub habitats (UDWR 1999b, 2002).

Mellow column (*Columella columella*) G?, UT-S2?. Two locations are known to northern Utah, one being in Lamb's Canyon (UDWR 1999b, 2002).

Mill Creek mountainsnail (*Oreohelix howardi*) G1, UT-S1. Three populations are known within Mill Creek Canyon, in Salt Lake County on the Wasatch-Cache NF (UDWR 1999b, 2002).

Mitered vertigo (*Vertigo concinnula*) G?, UT-S2?. Populations on the Wasatch-Cache NF have been identified in Lamb's Canyon, at Brighton, and in Little Cottonwood Canyon (UDWR 1999b, 2002).

Wasatch mountainsnail (Oreohelix periferica wasatchensis) C, G2, UT-S1. Populations on the Wasatch-Cache, and in Utah, are limited to the mouth of Ogden Canyon. They may occur throughout the area from Ogden Canyon to Taylor Canyon but this has not been verified.

Mussels

Western pearlshell (*Margaritifera falcata*) G4, UT-SH. Have been found in Northern Utah mostly at lower elevations adjacent to the Forest boundary (UDWR 1999b, 2002).

Insects

American emerald (*Cordulia shurtleffi*) G5, UT-S2. There are 8 sites for this species, 5 on the Wasatch-Cache, 1 on the Uinta, and 2 on the Ashley, all within the Uinta Mountains (UDWR 1999b).

Black meadowhawk (Sympetrum danae) G5, UT S2?. Common in wet grassy areas away from flowing water (Dunkle 2000).

Bleached skimmer (Libellula composita) G3, UT-S1,S2. Species is scattered and rare. It prefers spring fed ponds and streams (Dunkle 2000).

Boreal whiteface (Leucorrhinia borealis) G5, UT-S1). This species is found in high elevation lakes and wet meadows.

Dot-tailed whiteface (Leucorrhinia intacta) G5, UT-S1,S2. Found in high lakes and ponds.

Hudsonian whiteface (Leucorrhinia hudsonica) G5, UT-S1?. Found in high elevation lakes.

Lake darner (*Aeshna ermita*) G5, UT-S1,S2?. There are known populations on the Wasatch-Cache NF, ranging from high mountain lakes to lower elevation streams (UDWR 2002).

Mountain emerald (Somatochlora semicircularis) G5, UT-S2. This species is found in high elevation lakes.

Pacific spiketail (*Cordulegaster dorsaus*) G5, UT-S1,S2. The species has been known from Red Butte Canyon (UDWR 2002).

***Red-waisted whiteface (Leucorrhinia proxima*)** G5, UT-S1?. Found in high elevation lakes.

Spangler's hydroporus diving beetle (*Hydroporus spangleri*) GH, UT-SH. This species is known only from its type location in Lamb's Canyon on the Wasatch-Cache NF (UDWR 2002).

Taiga bluet (Coenagrion resolutum) G5, UT-S2?. The species is found in ponds and lakes. Elevational range appears to be from about 5,000 feet to 8,000 feet.

Zigzag darner (*Aeshna sitchensis*) G5, UT-S1,S2. There are 6 locations identified from northern Utah in the Uinta mountains (UDWR 2002).

Invertebrate Species Not Considered

The following invertebrate species were not considered in the Wasatch-Cache Forest Plan Revision. The same discussion applies that is at the beginning of the invertebrate species that were considered. Known occurrences were outside of the Forest, the species' occurrence on the Forest is incidental, and/or no potential habitat exists on the Forest. These are species for which viability is also of concern, however their main habitat is not associated with the Forest. They are mentioned here as they may occur within the same counties or adjacent to the Forest. If species are not mentioned, it is due to their locality being too far from the Forest to be mentioned. If inventory efforts show that any of these species do exist on Forest, they will be added to the list above.

Aquatic Snails

Ash gyro (*Gyraulus parvus*) G5, UT-S2?S3?. Known from 11 sites in Utah. None are on the Wasatch-Cache. While there may be potential habitat on the Forest, none are known to occur (UDWR 2002). Hovingh (personal communication, 2000) indicated that the species is very common across the country and could be taken off the list.

Coarse ramshorn (*Planorbella binneyi*) G4Q, UT-S2?. Of the locations listed in Salt Lake County, the only probable one where the species may still occur is City Creek Canyon which is off Forest (UDWR 1999b, 2002).

Creeping ancylid (*Ferrissia rivularis*) G5, UT-S2. Off Forest. The nearest location is East Canyon (UDWR 1999b, 2002).

Desert tryonia (*Tryonia protea*) G3,G4, UT-S2?. A west desert, Great Basin species. There are 3 populations known in larger spring areas at lower elevations around the Stansburys (UDWR 1999b, 2002).

Glossy valvata (*Valvata humeralis*) G5, UT-S2. Off Forest (UDWR 1999b, 2002).

Mud amnicola (*Amnicola limosus*) G5, UT-S2?. Off Forest. Closest site is Beck Hot Springs in 1939 (USWR 1999b, 2002).

Swamp lymnaea (*Lymnaea stagnalis*) G5, UT-S2?. The closest population was in Utah Lake and associated ditches and streams, and is likely extirpated (UDWR 1999b, 2002).

Toquerville springsnail (*Pyrgulopsis kolobensis*) G5, UT-S?. This species is widespread over the Great Basin, known as a result of a coop study between the BLM and the Smithsonian in 1993-94. It is possible that many springsnails were not classed out to genus and species and lumped in this group (UDWR 2002). Hershler (Smithsonian) thinks that *P. Kolobensis* in Utah may actually be a complex of several undescribed, unnamed species.

Utah physa (*Physella utahensis*) UT- Extirpated. Extirpated from Utah Lake, but occurs elsewhere in the State at low elevations (UDWR 1999b, 2002).

Widelip pondsnail (*Stagnicola traski*) GU, UT-S2?. Two historic locations from northern Utah are listed, however none on the Uinta (UDWR 1999b, 2002). Potential habitat is likely limited due to elevation.

Sharp sprite (*Promenetus exacuous*) G5, UT-S1,S2. Populations in Lamb's Canyon and three other locations at lower elevations (UDWR 1999b, 2002).

Southern Bonneville springsnail (*Pyrgulopsis transversa*) G2, UT-S1,S2. There are populations of this species off Forest in the vicinity of the Stansbury's and Vernon Units. Habitat and the species could occur on Forest (UDWR 2002).

Striate disc (*Discus shimelii*) G4, UT-S2. Eight locations were historically reported in Utah from high altitudes. One of these is in Logan Canyon (UDWR 1999b, 2002).

Terrestrial Snails

Rustic ambersnail (*Succinea rusticana*) G?, UT-S2?. Off Forest at lower elevations on the Wasatch Front and in Cache Valley (UDWR 2002).

Texas glyph (*Glyphyalinia umbilicata*) G5, UT-S1?. Historically reported from near the Wasatch-Cache NF in cottonwood groves (UDWR 1999b, 2002).

Widespread column (*Pupilla muscorum*) G4, UT-S1?. Off Forest. Closest location is City Creek Canyon (UDWR 1999b, 2002).

Mussels

California floater (*Anodonta californiensis*) G3, UT-S1. This species is in the Bear River drainage. It may go onto the Forest (UDWR 1999b, 2002, Hovingh, personal comm. 2000).

Oregon floater (*Anodonta oregonensis*) G5, UT-S1,S2?. Located in Utah, Salt Lake and Davis Counties, this species may be extirpated (UDWR 1999b, 2002). Hovingh (2000) stated that the species is only found in Utah Lake and below the Forest boundary in Farmington Creek and probably does not exist on the Forest.

Winged floater (*Anodonta nuttalliana*) G3,G4, UT-S2?. Historically located in Utah Lake, in Farmington Canyon and at lower elevations in Salt Lake County (UDWR 1999b, 2002).

Insects

California darner (*Aeshna californica*) G5, UT-S2. Known from 8 sites in Utah, none on the Wasatch-Cache NF. Habitat is likely lower elevation ponds and marshes (UDWR 2002).

Nokomis fritillary (*Speyeria nokomis nokomis*) G3, UT-S2?. The species is known from the Duchesne River at lower elevations (UDWR 2002)

Plains clubttail (*Gomphus externus*) G5, UT-S2. Off Forest at lower elevations along the Wasatch Front (UDWR 2002).

Conservation Approaches of Invertebrates

Invertebrates present a unique problem in that so little is known about them. Most survey work was accomplished prior to 1950 and work was very spotty. There has been no Forest wide survey of invertebrates to determine species composition and distribution. Forest direction will be to inventory streams and terrestrial habitats used by the invertebrates of concern to determine what is present and the distribution of the different species. With this knowledge the Forest can then develop conservation strategies and agreements, as necessary. Goals, subgoals, standards, and guidelines under Watershed Health and Biodiversity and Viability offer the protection needed for these species until more specific measures are determined to be necessary.

APPENDIX B - 3

Aquatic Diversity and Viability

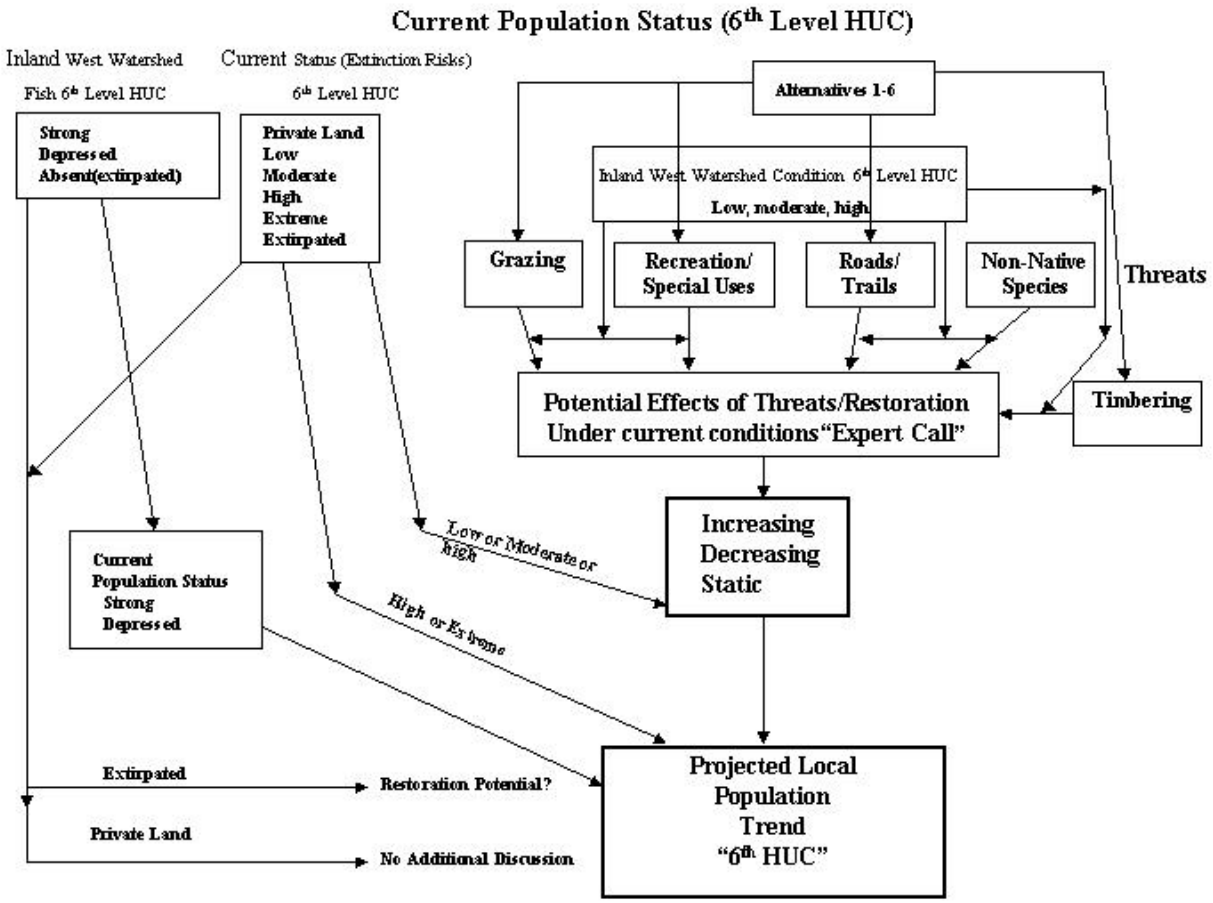
Introduction

This section describes the viability assessment that was conducted for fish species. Amphibians and aquatic invertebrate species are addressed in the "*Terrestrial Wildlife and Aquatic Invertebrate Species Viability*" section.

Planning regulations at 36CFR 219 require: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desirable non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which as the estimated number and distribution of reproductive individuals to insure it continued existence is well distributed in the planning area." The National Marine Fisheries Service (NMFS, McElhany et al. 2000) defines a viable salmonid population as "an independent population of salmonid that has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame."

In assessing a population, it is important to consider time frame and how individual risks may change over short and long time frames. A population that 15 years ago may have survived well under the threats of that day may not survive with increased threats that have been added over the past 10 years. For this analysis, threats are considered for two time frames, 15 years and 100 years. Fifteen years is being used because this is the maximum potential time frame for a Forest Plan and two to three generations of a fish. One hundred years is being used because it is long enough to allow for natural processes to occur. NMFS also suggests evaluating risks and threats over a 100-year time frame (McElhany et al. 2000). NMFS (McElhany et al. 2000) identifies four key parameters for evaluating populations status. They are abundance, productivity, population spatial structure and diversity. They believe that the general life history and habitat interactions are reflected in these factors. Although we have not directly related our process of risk and threat evaluation directly on NMFS parameters, we have addressed them through the analysis and will be identifying them in the steps that follow (Figure B-3-1).

Figure B-3-1. Population status flow chart to assess risks and threats as part of the Wasatch-Cache National Forest Plan.



Viability Assessment Process

This fish species viability assessment comprises the selection of fish species used in the analysis, including identification of fish species-at-risk and, if possible, focal species that could serve as indicators for effects on others. These species were then reviewed for existing risks at the 4th and 6th level Hydrological Unit Codes (HUC), potential threats and general trends. Viability for these species was assessed according to the likelihood of persistence of the species and their habitat through the alternatives given the risks and threats occurring for each. The specific steps used in this assessment are as follows:

Viability Assessments

1. Identify species to be used in analysis
    a. Identify all fish species known to historically be on the Wasatch-Cache NF, those that currently exist on or near the Wasatch-Cache NF, and those known to be downstream of lands managed by the Wasatch-Cache NF
    b. Identify species-at-risk selection criteria
        i. Those listed as Forest Service “Sensitive”, “Threatened”, “Endangered”, “Candidate” or “Proposed”.
        ii. Those of limited distribution
    c. Identify potential focal species that can be indicators for ecological conditions that affect viability for other species, and provide rationale
    d. Identify species and rationale for not addressing a species either directly or through an indicator
2. Provide ecological context for the species and their habitat.
    a. Ecosystems
    b. Species-wide
    c. Forest-wide
3. Provide background on data used in analysis
    a. Ecosystem information
    b. Species Status
        i. Extinction Risk Factors
        ii. Potential threats
4. Assess potential for extinction of a species at the 6th and 4th level HUC
    a. Potential for extinction by 6th level HUC
        i. Extinction risks by 6th level HUC
        ii. Potential threats by 6th level HUC
        iii. Likelihood of population persistence for 15 years and 100 years
    b. Assess potential for extinction by 4th level HUC
        i. Extinction risks by 4th level HUC
        ii. Likelihood of metapopulation persistence for 15 years and 100 years
5. Develop conservation approaches
6. Assess likelihood of species persistence across the Wasatch-Cache NF for 15 years and 100 years

The goals, objectives, standards, guidelines, and monitoring and evaluation guidance in the proposed revised Forest Plan for these species and their habitats were reviewed for adequacy in addressing risks and threats. The effects analysis for these species is documented in the Aquatic Resources section of Chapter 3 of the FEIS.

Step 1. Identifying Species Used in the Analysis

Step 1(a). Identify all species historically known to the Wasatch-Cache N.F.

Numerous fish species occur on the Wasatch Cache National Forest (WCNF, Table B-3-1). Fish native to the Forest are presented here. The distribution of fish species was identified through review of survey information and discussions with the Utah Division of Wildlife Resources. Much of this data was developed during the Inland West Watershed Initiative (IWWI). Species downstream of the Forest that could be affected by management of the Forest were also considered. Habitat descriptions are also presented for all fish species except those for which effects on viability by WCNF management actions are a concern, as determined in Step 1(b), below. Unless otherwise specified, description of range and habitat is based on species range-wide information.

Mottled and Paiute Sculpin (*Cottus sp.*) –Sculpin are found on the Forest. These fish are well distributed across the Forest (Table B-3-2) and are not viewed at risk based on their distribution and densities. Both sculpin need cool, clean, well-oxygenated water for survival. This is identical to the cutthroat trout. A number of streams on the forest contain sculpin (Table B-3-2). By maintaining habitat to support cutthroat trout, it assumed thatthe likelihood of supporting the viability of mottled and Paiute sculpin would be maintained.

Mountain Sucker (*Catostomus platyrhynchus*) – This species occurs in much of the western United States. The species is native to Utah, and can be found in both the Bonneville Basin and Colorado River system. The primary habitat for the mountain sucker is found off the WCNF with only fringe habitat being found on the Forest. The locations where mountain sucker have been found on Forest vary greatly; but are similar to those for mountain whitefish (Table B-3-2). The primary exception is that they are found in some lakes on the Forest. The mountain sucker population of greatest concern is the stream population located up Big Cottonwood Canyon. During surveys in 1998 only 2 suckers were captured near Brighton Ski Resort in Big Cottonwood Creek. No other suckers have been captured in Big Cottonwood Creek over the past 10 years, although much of the drainage has been surveyed for fish species. These fish may however just come downstream from Twin Lake, which contained mountain sucker when surveyed in 1981. Cook (1999) suggests that the suckers in Big Cottonwood Creek may be Catostomus Pantosteus, subgenus Acomus generosus. This was based on a review of what appears to be incomplete records of fish collected in the mid 1850's,when researchers identified the site as Cottonwood Creek. For this analysis, the mountain sucker in Big Cottonwood Creek will be grouped with mountain sucker in general because of the lack of any scientific data

suggesting they are a unique subspecies. This species is wide ranging and is not viewed as at risk by actions occurring on the Wasatch-Cache National Forest. By maintain habitat to support trout, it assumed that mountain sucker would be viable. Sigler and Sigler (1996) state, "Prevent of habitat degradation is the primary protection requirement.". In this plan, this is accomplished by providing habitat for the Bonneville and Colordo River cutthroat trout.

Bluehead Sucker (*Catostomus discobolus)* – Bluehead sucker are distributed in the Green River, upper Colorado River and upper Bear River drainages south to Arizona. They are also found in the Snake River above Shoshone Falls (Sigler and Sigler 1996). This species was identified as being present in the Analysis of the Management situation for forest planning revised in February 1984 page 50-46. It was then dropped from the Draft Forest Plan published in 2001. A recent review of the Natural Heritage database currently being developed by the, State of Utah, identified that bluehead sucker had been collected from the East Fork of Smiths Fork in 1967. Surveys have not been conducted recently to verify presence or absence of this species in the East Fork Smith Fork. This species has not been found in streams, adjacent to the East Fork Smith Fork, which have been survey. Bluehead sucker prefer cold stream of 68°F or less, but they prosper in arm small stream tolerating waters as warm as 82°F (Sigler and Sigler 1996). They are found in moderately swift moving water with a substrate of rocks, gravel or boulders mixed with mud and sand (Summerfelt 1983). This species is wide ranging and is not viewed as at risk by actions occurring on the Wasatch-Cache National Forest. There is a difference between the general habitat of this species and the Colorado River cutthroat trout. The bluehead sucker generally lives in larger, warmer streams, which would be downstream of most of the trout habitat. By maintaining habitat to support trout, conditions to support the bluehead sucker should be maintained and the populations on forest would remain viable. Sigler and Sigler (1996) identify predation and hybridization as the primary threats to the species.

Table B-3-1. Fish believed to have been found pre-settlement (1845) on the land currently administered by the Wasatch-Cache National Forest. Fish found downstream from the Wasatch-Cache National Forest that may be affected by land management activities. Fish introduced on the land administered by the Wasatch-Cache National Forest that continue to persist as of January 2002.

Fish	Scientific Name	Historically	Downstream	Introduced
Cutthroat Trout, Bonneville	*Oncorhynchus clarki utah*	X		
Cutthroat Trout, Colorado	*Oncorhynchus clarki pleuriticus*	X		
Long Nose Dace	*Rhinichthys cataractae*	X		
Mottled Sculpin	*Cottus bairdi*	X		
Paiute sculpin	*Cottus beldingi*	X		
Mountain Whitefish	*Prosopium williamsoni*	X		
Mountain Sucker	*Catostomus platyrhynchus*	X		
Bluehead Sucker	*Catostomus discobolus*	X		
Colorado Pikeminnow	*Ptychocheilus lucius*		X	
Colorado River Roundtail Chub	*Gila robusta robusta*		X	
Humpback Chub	*Gila cypha*		X	
Bonytail Chub	*Gila elangas*		X	
Razorback Sucker	*Xyrauchen texanus*		X	
June Sucker	*Chasmistes liorus mictus*		X	X
Arctic Grayling	*Thymallus arcticus*			X
Black Crappie	*Pomoxis nigromaculatus*			X
Bluegill	*Lepomis macrochirus*			X
Brook Trout	*Salvelinus fontinalis*			X
Brown Trout	*Salmo Trutta*			X
Common Carp	*Cyprinus carpio*			X
Golden Trout	*Oncorhynchus aguabonita*			X
Kokanee (lacustrine sockeye salmon)	*Oncorhynchus nerka*			X
Largemouth Bass	*Micropterus salmoides*			X
Rainbow Trout	*Oncorhynchus mykiss*			X
Smallmouth Bass	*Micropterus dolomieu*			X
Tiger Muskie	*Esox ♀masquinongy X ♂lucius*			X
Yellow Bullhead Catfish	*Ameiurus melas*			X
Yellow Perch	*Perca flavescens*			X
Yellowstone Cutthroat Trout	*Oncorhynchus clarki bouvieri*			X

(Adapted from Lentsch et al. 1995)

Table B-3-2. Stream and lakes surveyed on the Wasatch-Cache National Forest that containing native fish other then cutthroat trout. There are many additional lakes and some streams that have not been surveyed and/or summarized. The information presented in the table comes from surveys conducted by Utah Division of Wildlife Resources, Wyoming Game and Fish and the Wasatch-Cache National Forest.

Stream	Drainage	County	Whitefish	Sculpin	Mt. Sucker	Dace
East Fork Bear River	Bear River	Summit	No	Yes	Yes	Yes
Hayden Fork	Bear River	Summit	Yes	Yes	No	No
Mill City Creek	Bear River	Summit	No	Yes	No	No
Mill Creek	Bear River	Summit	No	Yes	No	No
North Fork Mill Creek	Bear River	Summit	No	Yes	No	No
Ostler Fork	Bear River	Summit	No	Yes	No	No
Stillwater Fork	Bear River	Summit	Yes	Yes	Yes	No
Teal Lake Trib.	Bear River	Summit	No	Yes	No	No
West Fork Bear River	Bear River	Summit	No	Yes	No	No
Hidden Lake	Beaver Creek	Summit	No	No	Yes	No
Middle Fork Of Beaver Creek	Beaver Creek	Summit	No	Yes	No	No
East Fork Of Blacks Fork	Blacks Fork	Summit	Yes	Yes	No	No
Little East Fork Blacks Fork	Blacks Fork	Summit	Yes	No	No	No
Little West Fork Blacks Fork	Blacks Fork	Summit	No	No	Yes	No
West Fork Of Blacks Fork	Blacks Fork	Summit	Yes	Yes	Yes	No
Curtis Creek	Blacksmith Fork	Cache	No	Yes	No	No
Rock Creek	Blacksmith Fork	Cache	No	No	Yes	No
Henrys Fork	Henrys Fork	Summit	No	Yes	Yes	No
Big Cottonwood Creek	Jordan River	Salt Lake	No	No	Yes	No
West Fork Muddy Creek	Muddy Creek	Summit	No	Yes	No	No
Left Fork, South Fork Ogden	Ogden River	Weber	No	Yes	No	No
Right Fork, South Fork Ogden	Ogden River	Weber	No	Yes	No	No
Boulder Creek	Provo River	Summit	No	Yes	No	No
North Fork Provo River	Provo River	Summit	No	Yes	Yes	No
Upper Provo River	Provo River	Summit	No	Yes	No	No
China Lake	Smiths Fork	Summit	No	No	Yes	No
Steel Creek	Smiths Fork	Summit	No	Yes	No	No
West Fork Of Smiths Fork	Smiths Fork	Summit	No	Yes	Yes	No
Beaver Creek	Weber River	Summit	Yes	Yes	Yes	Yes
Coop Creek	Weber River	Summit	No	Yes	No	No
Gardners Fork	Weber River	Summit	No	Yes	No	No
Redpine	Weber River	Summit	No	Yes	No	No
Shingle Creek	Weber River	Summit	Yes	Yes	Yes	No
Slate Creek	Weber River	Summit	Yes	Yes	No	No
South Fork Weber	Weber River	Summit	No	Yes	No	No
Yellow Pine Creek	Weber River	Summit	No	Yes	No	No
W.F. Beaver	Burnt Fork	Summit	No	Yes	No	Yes
W.F. Smiths Fork	Smiths Fork	Summit	Yes	Yes	Yes	No

Longnose Dace *(Rhinichthys cataractae)*
The primary habitat for the dace is found off the WCNF with only fringe habitat being found on the Forest. The two locations where dace have been found on Forest are at the Forest boundary in Beaver Creek (Weber River Drainage, Summit County) and the East Fork of the Bear River (Table B-3-2). These species are wide ranging and are not viewed as at risk by actions occurring on the Wasatch-Cache National Forest and will not be discussed further. Sigler and Sigler (1996) identify predation as the primary limiting factor and also state that water quality is important management factor. Bonneville cutthroat trout are found in all of the locations where the long nose dace is found. By maintain habitat to support trout, it assumed that the longnose dace would be viable.

Colorado River Cutthroat Trout (*Ochorhynchus clarki pleuriticus)* – The Colorado River cutthroat trout has been petitioned for Federal listing under the Endangered Species Act. This species has been identified as a "Species-at-Risk" under step 1(b) and will be discussed further under the "Species-at-risk" section (Step 1(a,b)) and Species status (Steep 2a, 3a).

Bonneville Cutthroat Trout (*Ochorhynchus clarki utah)* – The Bonneville cutthroat trout has been petitioned for Federal listing under the Endangered Species Act. It is also listed as a Forest Service Sensitive Species. This species has been identified as a "Species at Risk" under step 1(b) and will be discussed further under the "Species at Risk" section (Step 1(a,b)) and Species status (Step 2a, 3a).

Mountain Whitefish (*Prosopium williamsoni*) – In general, this species is wide ranging and is viewed as at minimal risk by actions occurring on the Wasatch-Cache National Forest. The primary habitat for the mountain whitefish is found off the National Forest with only fringe habitat being found on the Forest. The locations where mountain whitefish have been found on Forest are at the Forest boundary in the upper Bear River, Beaver Creek (Weber River Drainage, Summit County) and the Blacks Fork River (Table B-3-2). They are also found in the Logan River Drainage and the Blacksmith Fork. Monitoring of the Logan River population by the Utah Division of Wildlife Resources (Thompson et al. 2000) in 1999 suggest that no change has occurred in these isolated populations. Sigler and Sigler (1996) in Fishes of Utah state that, "Mountain whitefish appear to be prospering throughout their range." Cutthroat trout are found in all streams containing mountain whitefish. By maintaining habitat to support cutthroat trout, it is assumed that mountain whitefish would be viable. This is assumed because the two species are found occupying similar habitat where they coexist and their basic habitat requirement are similar. Whitefish are fall spawners and so some of the threats would be reduced as the potential for trampling is reduced.

There are a number of fish not historically found on the WCNF, but which were historically found in Utah, that could potentially be impacted by management actions. These species live in streams, rivers, lakes and/or reservoirs within a reasonable distance

downstream of the Wasatch-Cache NF. These include the following Species at Risk, as identified in Step 1(b), and are as follows:

Colorado Pikeminnow (*Ptychocheilus lucius*) – This federally endangered species, previously known as the Colorado squawfish, historically occurred in large rivers throughout the Colorado River system. The remaining populations are largely limited to Utah. Threats include habitat alterations, especially construction of large dams, which are believed to prevent spawning migrations and to change the flow and temperature regimes are critically important to the species. Another probably threat is predation from exotic game fish species. The primary WCNF concern has been with water withdraws on the Forest in the Green River Drainage. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest. No viability analysis will therefore be conducted for this species.

Razorback sucker (*Xyrauchen texanus*) –This Federally Endangered species is endemic to large rivers of the Colorado River system. Alterations in water flow and temperatures, due to damming; and possibly predation by introduced fishes have been identified as potential threats to this species. The primaryWCNF concern has been with water withdraws on the Forest in the Green River Drainage. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest. No viability analysis will therefore be conducted for this species.

Humpback chub (*Gila cypha*) – This Federally Endangered species is endemic to the Colorado River system, where it is uncommon and locally concentrated, usually in deep, swift-river, canyon-shaded segments. Damming has eliminated and altered habitat and favored exotic fish predators and competitors. The primary WCNF concern has been with water withdraws on the Forest in the Green River Drainage. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest. No viability analysis will therefore be conducted for this species.

Bonytail Chub (*Gila elegans*) – This Federally Endangered species is endemic to the Colorado River system, and has now been extirpated from much of its range. It possibly survives only in the Green River in eastern Utah. Habitat alteration is considered the greatest threat to this species. The primary WCNF concern has been with water withdraws on the Forest in the Green River Drainage. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest. No viability analysis will therefore be conducted for this species.

June Sucker (*Chasmistes liorus*) – The June Sucker is currently listed as an Endangered species. It historically inhabited Utah Lake and migrated up large tributary streams to spawn. Historically, commercial fishing, dewatering ofthe Provo River, and severe drought decimated this species. Pollution, predation by nonnative species, and hybridization with other species has been identified as current threats.

June suckers were stocked in Red Butte Reservoir, on the Wasatch-Cache National Forest, in 1992. The purpose of this stocking was to provide a holding area for the fish. Since then the fish have successfully reproduced. It is suspected that there are currently more juvenile fish in the reservoir then its natural habitat of Utah Lake. Red Butte Reservoir is currently within a Research Natural Area and will not be impacted by the Forest's land management actions.

The Wasatch-Cache National Forest is also upstream of the native habitat of the June Sucker. The primary concern has been with water withdraws on the Forest in the Prove River Drainage. Other Forest land-management impacts would be eliminated as the water passes through Jordanelle and Deer Creek Reservoirs. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest. No viability analysis will therefore be conducted for this species.

In addition, several fish species not historically found on the WCNF or in Utah, inhabit streams, lakes and reservoirs on the WCNF. Many of these are valued for providing a sport fishery, but none are considered rare. These fish are well distributed across their range, are very common, and are not considered to be at risk based on their distribution and population levels. Habitat for the trout and kokanee are similar to those of cutthroat trout. As we provide habitat conditions for the cutthroat trout the conditions for these species should be met. These species include:

Rainbow Trout (*Oncorhynchus mykiss*) – The rainbow trout is an extremely popular sport fish. Although native to western North America, it is not native to Utah. This species has been introduced to many Utah, and WCNF, coldwater streams, rivers, lakes and reservoirs. Only a few streams contain naturally reproducing populations of rainbow trout. Many of the accessible lakes are stocked to provide for local fisheries. It is anticipated that the stocking of sterile rainbow trout will be focused on lakes and reservoirs over the next 15 years as the importance of protecting and enhancing native fish expands.

Brown Trout (*Salmo trutta*) – This sport fish species is native to Europe and western Asia. Over the last 100 years, the species has been stocked in many streams in Utah and is common in many WCNF streams. Brown trout populations have remained relatively stable on the Forest over the past 15 years. Brown trout are not currently stocked on the Forest, and populations are maintained by natural reproduction. Brown trout are not viewed at risk on the WCNF.

Brook Trout (*Salvelinus fontinalis*) – This sport fish is native to eastern United States and Canada. Although not native to Utah, the species is common in many of Utah's cold high-elevation lakes and streams. In Utah, successful reproduction of brook trout often leads to overcrowding. The species is present in several WCNF streams and lakes. Brook trout in streams and some lakes are maintained by natural reproduction and through stocking or natural reproduction in local lakes. Brook trout are not viewed at risk on the WCNF.

Kokanee Salmon (*Oncorhynchus nerka*) – The kokanee is a landlocked form of sockeye salmon. The kokanee is a popular non-native game fish. This species has been introduced into many reservoirs in the western United States, including several in Utah. Kokanee are currently found only in Causey Reservoir on the WCNF. This population appears to be able to sustain it's self. If the cutthroat trout populations are provided for in the drainage there should be little need to analyze the kokanee. The species will not, therefore be considered for viability analysis.

Arctic Grayling *(Thymallus arcticus)*
Grayling are able to reproduce in lakes and appear to do well in a variety of conditions. All known populations on Forest appear to be self sustaining and capable of supporting sport fisheries.

Golden Trout *(Oncorhynchus aguabonita)*
Golden trout have occurred in a limited number of lakes on the Forest. They require streams to reproduce and are thus limited by spawning habitat in the areas where they have been stocked. Golden trout are used as a management species to provide a diversity of fishing opportunities. These populations will only be maintained or expand through stocking by the Utah Division of Wildlife Resources. General land management actions will not affect the viability of these species throughout the planning area.

Yellowstone Cutthroat Trout *(Oncorhynchus clarki bouvieri)*
It is currently undetermined if Yellowstone cutthroat trout migrated into the Bear River during presettlement times. The fish in the Bear River are viewed as Bonneville cutthroat trout as identified in the conservation plans. Yellowstone cutthroat trout populations have been maintained primarily through stocking. Yellowstone cutthroat trout stocking has been reduced as the need to preserve and expand existing native cutthroat trout populations was emphasized. Because these fish are stocked, they are not viewed at risk on the Wasatch-Cache National Forest.

Warm Water Species
Black crappie, bluegill, common carp, smallmouth bass, largemouth bass, tiger muskie, yellow bullhead catfish and yellow perch are only found on the Forest at Pineview Reservoir. Management activities in the area are predominately recreational boating, swimming and fishing. The greatest impact to these fish is water withdraws which are outside the control of the Wasatch-Cache National Forest. It is beyond the ability of the Forest to directly alter the viability of these species through our management activities. These fish will not be address further.

Step 1(b): Identify Species-at-Risk

Fish Species-at-Risk (SAR) and their distribution within the planning area were identified (Table B-3-3). The planning area includes lands within the administrative boundary of the Wasatch-Cache National Forest. Of the known fish species on or near the WCNF that

management activities could impact, fish species-at-risk were identified (Figure B-3-1) and selected based on the following criteria from other known lists:

1. Occurrence on the Federal Threatened, Endangered, Proposed, and Candidate Species lists (USDI 2000),
2. Utah State Sensitive Species List and Natural Heritage Database (UDWR 1998) were used to identify S1 and S2, and G1, G2, and G3 species. Wyoming Fish Species of Concern *(http://uwadmnweb.uwyo.edu/wyndd/fish/fish.htm)*
3. Intermountain Region Forest Service Sensitive Species List (USDA 1995),

Table B-3-3. The fish species at risk on or downstream of the Wasatch-Cache National Forest, Utah.

Fish	Scientific Name	Comments
Cutthroat Trout, Bonneville	*Oncorhynchus clarki utah*	FS Sensitive
Cutthroat Trout, Colorado River	*Oncorhynchus clarki pleuriticus*	FS Sensitive
Colorado Pikeminnow	*Ptychocheilus lucius*	FWS Endangered
Humpback Chub	*Gila cypha*	FWS Endangered
Bonytail Chub	*Gila elangas*	FWS Endangered
Razorback Sucker	*Xyrauchen texanus*	FWS Endangered
June Sucker	*Chasmistes liorus mictus*	FWS Endangered

(Adapted from Lentsch et al. 1995)

For consideration in this viability analysis, the species listed were then evaluated for the extent of potential habitat or occurrence on the WCNF based on any known historic or current collections. The potential of Forest activities in affecting their status and condition of their habitat was reviewed.

This list of SAR, from a viability perspective, will likely change in the future, with species added and possibly others being deleted. The revised Forest Plan will incorporate adaptive management to allow for appropriate changes to revised goals, subgoals, objectives, standards and guideline.

Species-at-Risk: Bonneville and Colorado River Cutthroat Trout

Bonneville and Colorado River cutthroat trout were the only fish identified by this analysis as species-at-risk for which a viability assessment was conducted (Table B-3-4). These two subspecies are viewed at risk not because of their existing condition on the Forest but because of their current range-wide condition and their status as a sensitive species (30CFR219.36). Both of these subspecies have been petitioned for listing under the Endangered Species Act.

Table B-3-4. Fish species of concern for viability on or potentially affected by management of the Wasatch-Cache National Forest.

Common Name (Scientific Name)	Habitat	Federal Status	State Rank	Global Rank
Colorado River cutthroat trout (*Ochorhynchus clarki pleuriticus)*	Native to and presently found on Wasatch-Cache NF	FS Sensitive	S2	G4T2T3
Bonneville cutthroat trout (*Oncorhynchus clarki utah*)	Native to and presently found on Wasatch-Cache NF	FS Sensitive	S1S2	G4T2

Proposed FS Sensitive: Proposed for addition to the Intermountain Region Sensitive Species List, per draft list dated 07-20-1999.

** Natural Heritage Program conservation rankings

G:	Ranking based upon "global" or range-wide distribution and abundance
T:	Range-wide ranking for a sub-specific "taxon," such as a variety or subspecies.
S:	"State" ranking, i.e., within Utah.
G1/T1/S1:	Indicates extreme rarity or other factor(s) making the species especially vulnerable to extinction or extirpation (typically five or fewer occurrences or very few remaining individuals or acres).
G2/T2/S2:	Indicates rarity or other factor(s) making the species very vulnerable to extinction or extirpation (6-20 occurrences or few remaining individuals or acres).
G4/T4/S4:	Indicates a species that is widespread, abundant, and apparently secure, though it may be quite rare in parts of its range, especially at the periphery (usually more than 100 occurrences).

Step 1(c): Species-at-risk for which viability analysis will be based on assessment for Bonneville or Colorado River cutthroat trout

Several native species-at-risk found on or are adjacent to the Forest will be analyzed for viability through the analysis for Bonneville or Colorado River cutthroat trout as an indicator of their viability requirements. The assumptions is made that by meeting the biological needs of the cutthroat trout, the biological needs of these species will also be met. These species, for which the cutthroat trout would be considered their "focal species", are mountain whitefish, mountain sucker, bluehead sucker, sculpin, arctic grayling and rainbow, brook, brown, and golden trout.

Step 1(d): Species-at-risk for which viability analysis was not conducted because of no effect or because viability requirement are addressed by aquatic ecosystem management

Colorado River Fishes

The Colorado River fishes that may be a concern include the bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), and roundtail chub (*Gila robusta*). All of these fish, with the exception of the roundtail chub, are listed as endangered under the Endangered Species Act. These species reside off-Forest, and Wasatch-Cache National Forest consultation with the Fish and Wildlife Service is required only for water withdraw projects on the Forest (personal communication from Michael M. Long, 22 March 2000). No site-specific projects are identified in the Forest Plan that

would restrict water flows from the Forest; therefore, no effects from Forest activities are expected. No viability analysis will therefore be conducted for this species.

June Sucker
This species historic habitat is off-Forest, and Forest Service consultation with the Fish and Wildlife Service is similar to the Colorado River fishes. Water withdraw projects are the only projects that may impact the June suckers found in their historic habitat. No site-specific projects are identified in the Forest Plan that would restrict water flows from the Forest; therefore, no effects from Forest activities are expected. No viability analysis will therefore be conducted for this species.

Other Fish Species
No desirable non-native species have been identified as being at risk.

Step 2. Ecological Context for the Species and Their Habitat

Step 2(a) Ecosystem

An important viability consideration for the Wasatch-Cache National Forest is the role that National Forest lands contribute to habitat for the Bonneville and Colorado River cutthroat trout. This includes considering the connectivity of populations of cutthroat trout within and between watersheds. The ecological systems on which these species depend on the WCNF are the stream systems of the Forest. The description of the watersheds, conditions, ecological processes, and land uses is presented in the Preliminary Analysis of the Management Situation (PAMS) and summarized in Chapter 2 of the Proposed Plan. Other fish species on the Forest are previously described in Step 1 of this assessment.

The IWWI database, along with other sources, was used to define the ecological context for the cutthroat trout (Figure B-3-3). The data for the Rocky Mountain and Intermountain Regions of the Forest Service were developed in 1999 through a joint effort between the state wildlife and fish agencies and the Forest Service. The WCNF data was then checked by the Forest Fish Biologist to identify potential errors in the datasets. Data for the other forests were to be reviewed by their staff. The ecological context contains a number of parts and logic paths (Figure B-3-2).

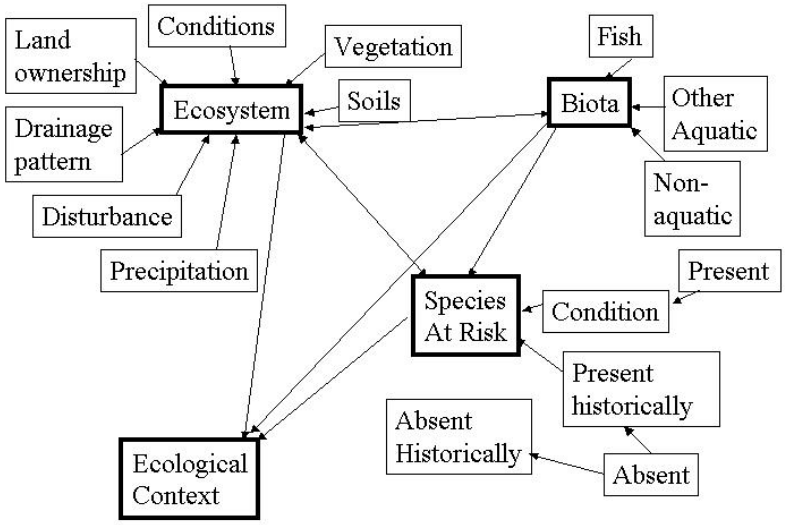


Figure B-3-2. Factors considered as part of the overall ecological context of a species.

Ecological Context – Biota – Fish

Biotic information is the primary factor used from the IWWI to define the Ecological Context (Figure B-3-2). Biotic Information was collected at each 6th-field subwatershed and rated for the status of the cutthroat trout subspecies. The status calls for the 6th field subwatersheds were then combined to formulate a range wide and a Forest wide discussion for Ecological Context. Other reports and information were also used to supplement the data for this discussion. Data for the biotic part of the Ecological Context were obtained on 9 November 2000. It was downloaded from (Htttp://fsweb:r4.fs.fed.us/unit/bpr/iwwi/iwwi.html). The value of the streams on the Wasatch-Cache National Forest, for cutthroat trout, is described at the subspecies level. This provides the context for the discussion of land management in the planning area. During this analysis, the only time private lands or other national forest lands are discussed is at the range wide level. Streams where cutthroat trout populations have been extirpated are reviewed for their restoration potential. Generally, streams identified for cutthroat trout restoration are those where (1) existing populations in the drainage could be expanded, (2) restoration work is technically feasible, and (3) where meta-populations could be strengthened.

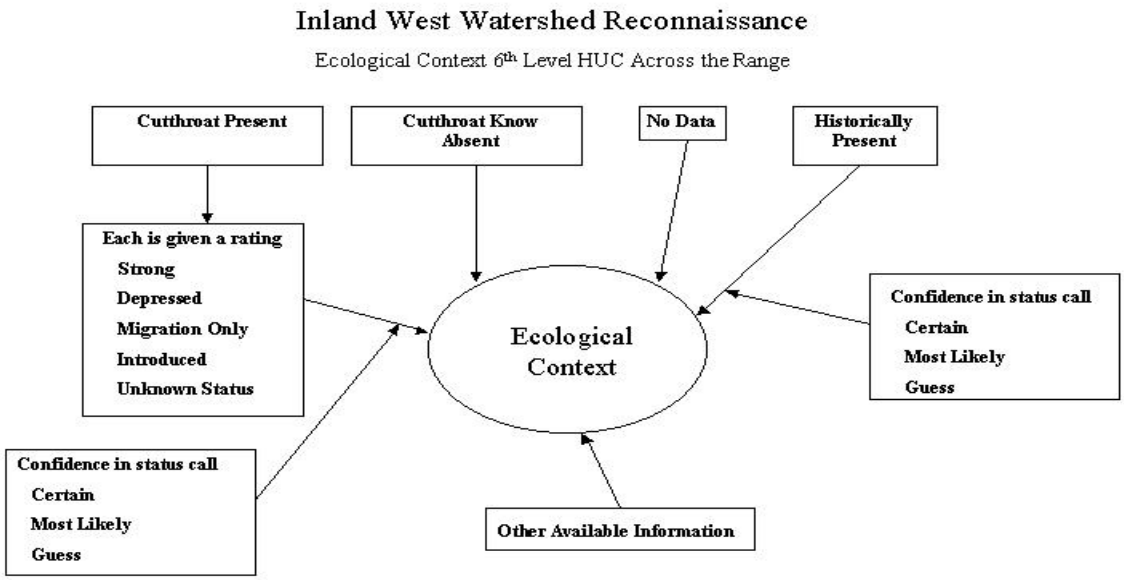


Figure B-3-3. The flow chart to develop the ecological context for fish species-at-risk on the Wasatch-Cache National Forest, at the species wide and Forest wide.

Bonneville Cutthroat Trout *(O. clarki utah)* [Imperiled Status: Petitioned for listing as "Threatened"—ESA; "Conservation Species"—State of Utah, "Native Species Status 2"—State of Wyoming, S2-Natural Heritage Rank]

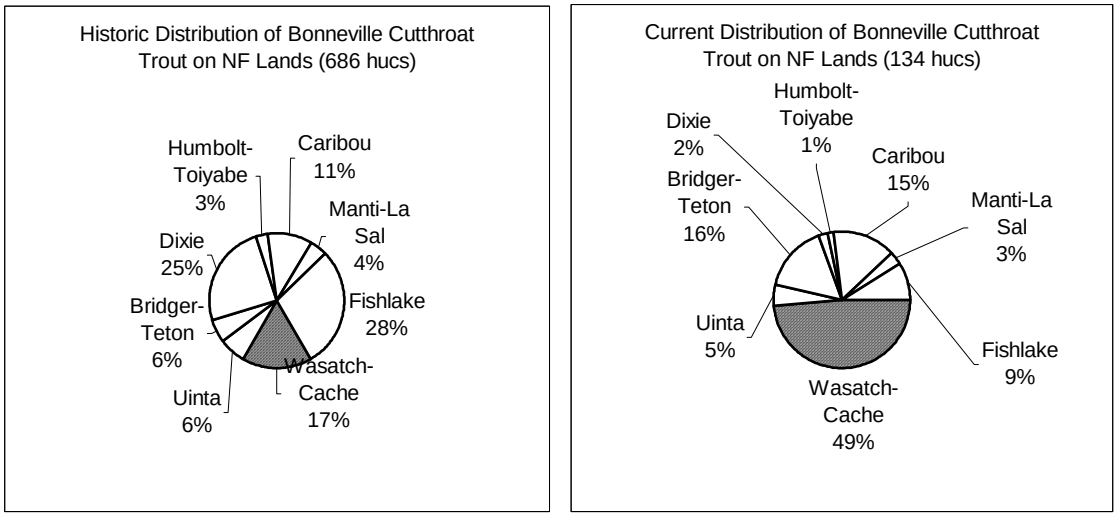
Step 2(b) Species Range-Wide: For the range of the Bonneville cutthroat trout, the Snake River Drainage forms the boundary on the north, the Colorado River on the east and south and the Nevada desert lands and drainages on the west. Historically, Bonneville cutthroat trout occupied approximately 90% of the Bonneville Basin (Duff 1996). May, in a rough estimate, suggests that Bonneville cutthroat trout are presently found in about 5% of their historic habitat (Personal Communication, Bruce May, Inland Cutthroat Trout Conservation Coordinator, April 12, 2000).

Step 2(c) Forest Service and Wasatch-Cache National Forest

Eighty to ninety percent of the remaining populations currently reside on National Forest Lands (Personal Communication, Bruce May, Inland Cutthroat Trout Conservation Coordinator, April 12, 2000). If Bonneville cutthroat trout were spread throughout what are now National Forest lands, within its historic range, the Wasatch-Cache National Forest would have had Bonneville cutthroat trout in 92 sixth level HUCs. Rangewide, Bonneville cutthroat trout are found in 134 (20%), sixth level HUCs, of their historic 686 sixth code HUCs found on National Forest

lands. Of the 134 HUCs where Bonneville cutthroat trout are present, they are strong in 48 (36%), depressed in 75 (56%) and present with the strength being unknown in 15 (11%) of the HUCs. It is unknown what is in 45 HUCs. If all of the 6th level HUCs on National Forest Lands, within their historic range, were counted, the Wasatch-Cache National Forest would have had 17 percent (Figure B-3-4). The Wasatch-Cache National Forest has 65 (49%) of the existing 134 HUCs in which cutthroat trout are present (Figure B-3-4).

Figure B-3-4. Historic and current distribution of Bonneville cutthroat trout between forests by the number of 6th level **HUCs.**



Other lands: The above analysis does not take into account the populations on private, tribal or of Bureau of Land Management lands (BLM). The main population known of on private lands is in the Chalk Creek Drainage, a tributary to the Weber River. The Chalk Creek Drainage was surveyed in 1999 and was found to contain 103 stream miles of habitat occupied by cutthroat trout believed to be the Bonneville subspecies (Thompson 2000). The BLM and the Goshute Indian Tribe manages approximately 36 miles of stream containing Bonneville cutthroat trout. These populations are primarily found in the Deep Creek Mountains (USFWS 2000).

Colorado River Cutthroat Trout *(O. clarki pleuriticus)* [Imperiled Status: Petitioned for listing as "Threatened"—ESA; "Conservation Species"—State of Utah, "Native Species Status 2"—State of Wyoming, S2-Natural Heritage Rank]

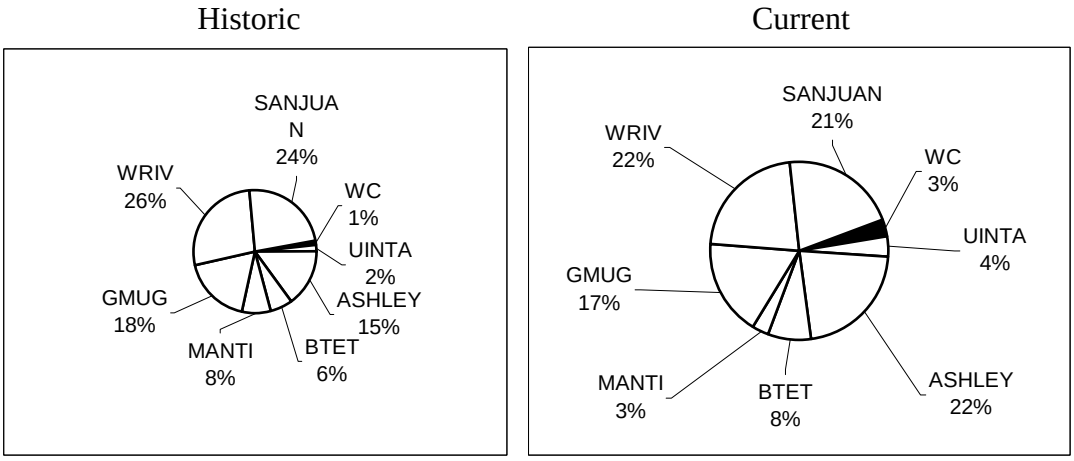
Step 2(b) Species Range-Wide: The range of the Colorado River cutthroat trout is bounded by the Missouri, Snake, and Bonneville drainages and then the temperature gradient of the Colorado River it's self. Historically Colorado River cutthroat trout occupied all accessible cool waters of the Upper Colorado River Drainage, including the Green, Yampa, Gunnison, Dolores, San Juan, Duchesne, and Dirty Devil rivers (Young et al. 1996). May, in a rough estimate, suggests that Colorado River cutthroat trout are presently found in about 1-2% of their historic

habitat (Personal Communication, Bruce May, Inland Cutthroat Trout Conservation Coordinator (April 12, 2000). Ninety-five to one hundred percent of the remaining populations currently reside on National Forest Lands (Personal Communication, Bruce May, Inland Cutthroat Trout Conservation Coordinator (April 12, 2000). This subspecies was found on eight national forests in the states of Wyoming, New Mexico, Colorado and Utah.

Step 2(c) Forest Service and Wasatch-Cache National Forest

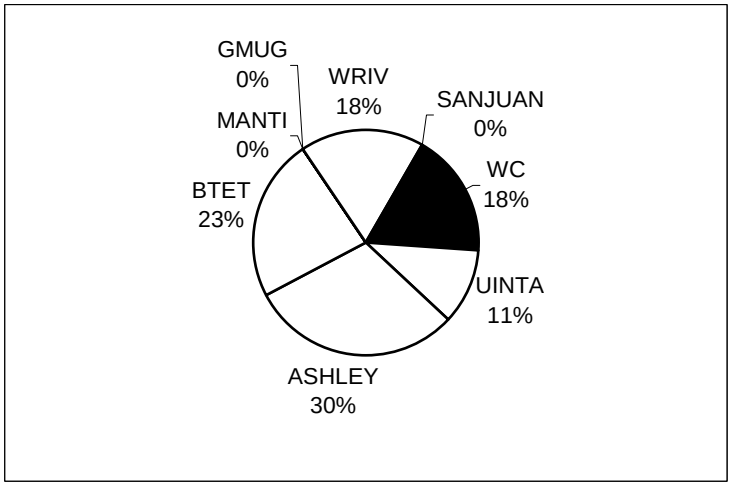
Historically, if a person were to assume that Colorado River cutthroat trout were spread throughout what is now National Forest Lands, within its historic range, the Wasatch-Cache National Forest would have had cutthroat trout in 15 sixth level HUCs. If all of the 6th level HUCs on National Forest Lands, within the historic range, were counted the Wasatch-Cache National Forest would have had 1 percent. The Wasatch-Cache National Forest has 11 (3%) of the existing 364 HUCs in which cutthroat trout are present (Figure B-3-5). Colorado River cutthroat trout are found in 364 (26%), sixth level HUCs, of their historic 1,357 sixth level HUCs found on National Forest lands. Of the 364 HUCs whereColorado River cutthroat trout are present, they are strong in 56 (15%) of which 10 (18%) are on the WCNF (Figure B-3-6). Populations are depressed in 129 (35%) HUCs, of which 1 in on the WCNF. Range-wide on National Forest Lands Colorado River cutthroat trout are present with the strength being unknown in 179 (49%) of the HUCs. It is unknown if cutthroat trout are present in 520 HUCs.

Figure B-3-5. Historic and current distribution of Colorado River cutthroat trout between forests by the number of HUCs.



WC= Wasatch-Cache National Forest
UINTA= Uinta National Forest
ASHLEY= Ashley National Forest
BTET= Bridger-Teton National Forest
MANTI= Manti-LaSal Naitonal Forest
GMUG= Gunnison and Uncompahgre National Forests
WRIV= White River National Forest
SANJUAN= San Juan National Forest

Figure B-3-6. Current strong population distribution of Colorado River cutthroat trout between forests by the number of HUCs.



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WRIV= White River National Forest
SANJUAN= San Juan National Forest

Step 3. Data Used in the Analysis

A number of existing and newly developed databases were used in the analysis. The data used in the analysis is listed below.

Step 3 (a) Ecosystem Information

1. **Lakes, Reservoirs, and Streams:** The Forest GIS data base was used to identify intermittent and perennial streams, and lakes and reservoirs.

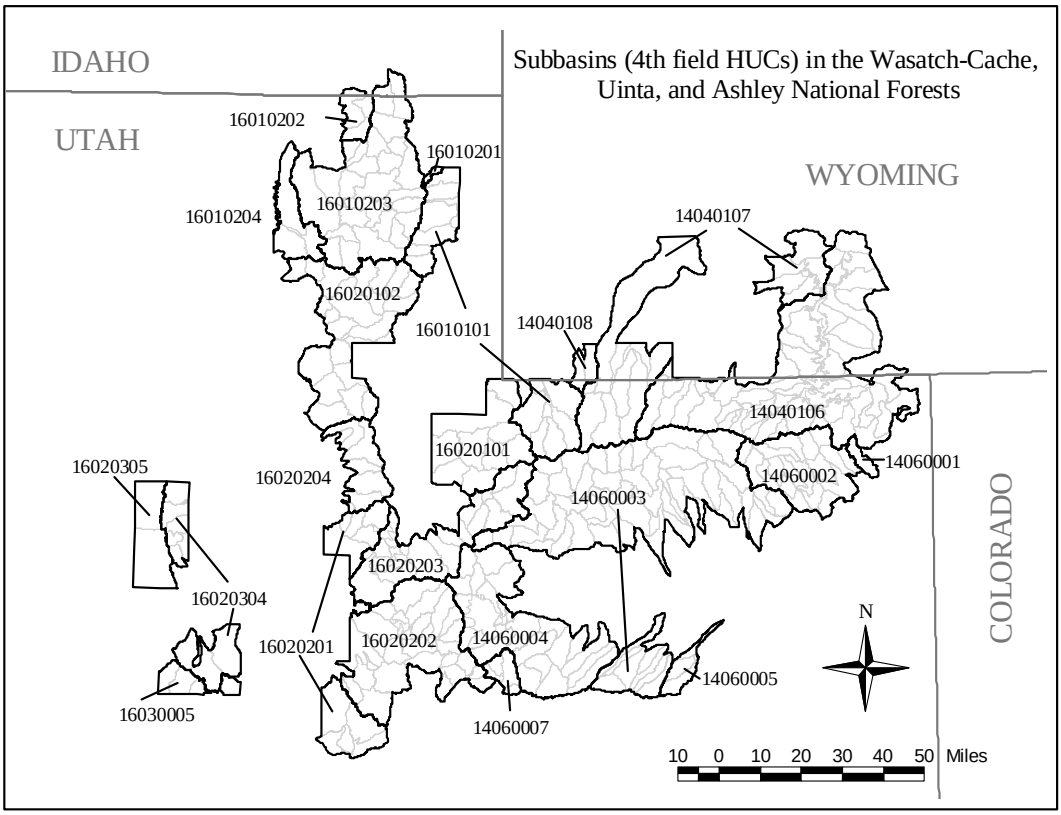
2. **4th through 6th Level Hydrologic Unit Code (HUC)**: Sixth (6th) level HUCs were used as a primary analysis layer in the IWWI analysis (Figure B-3-7). The watershed layer on the Forest's GIS system identifies watersheds at varying scales and this data was used in the viability assessment.

3. **Forest Boundary:** The WCNF administrative boundary was used in the analysis. This allowed the information to be applied on lands managed by the Forest.

4. **Land Ownership**: Existing land ownership was used. All alternatives project some land adjustment (amount does not vary by alternative); however, the alternatives do not identify what tracts would be acquired or disposed of. It would be highly speculative to project where this might occur. Existing land ownership is displayed in

the Forest's GIS system and this was used for all analyses. Lands not managed by the WCNF were not included in the analysis. A review of the land ownership GIS layer verified that all of the latest land purchases or exchanges had been identified and included.

Figure B-3-7. Forth and sixth level HUCs found on the Wasatch-Cache, Ashley and Uinta National forests in Utah and Wyoming.



5. **Fish Survey Data**: For the WCNF, fish survey data is located in the "Locations.xls" database and includes fish species distribution, fish densities, sample locations and some general notes about the sample sites. Also included in the review are the yearly reports compiled by the Forest Service and the Utah Division of Wildlife Resources. This information covers the years 1993 through 2001 and includes surveys throughout the Wasatch-Cache National Forest.

6. **Grazing Allotment Boundaries and Head Months:** Existing grazing allotment boundaries were used for the analysis. Head months for animals were pulled from the INFRA Forest database. A headmonth is one animal spending 30.416667 days on an allotment (365 days/12 months = 30.4 days per month). If 365 days divided by 12 months = 30.416667 days per month. Chapter 3 Topic 7 contains the head month data used in the analysis. It is recognized that grazing threats may be reduced by a number of management actions (ie. herding, off channel water development, grazing rotations, fencing etc.). In this analysis these management actions are not taken into account because examples exist across the Forest where such actions have not been

fully successful in preventing impacts to aquatic ecosystems. These are considered at the project level analysis.

7. **Capable Grazing Lands:** This is a GIS map layer of the lands capable of being grazed by sheep and/or cattle on the WCNF.

8. **Timber Boundaries:** This is a GIS map layer of the lands capable of providing harvestable timber on the WCNF.

9. **Alternative Maps:** Alternative maps were used to identify management prescriptions.

Landscape conditions: Information used for establishing the landscape conditions for the species are based on IWWI classifications at the 6th field HUC for Geomorphic integrity, water quality integrity, and watershed vulnerability. The synopsis across the Forest is presented below.

10. **Geomorphic Integrity:** Each 6th-field subwatershed will be rated for its soil-hydrologic function and stream resilience. This information was collected as part of the Inland West Watershed Analysis and was obtain on 9 November 2000 from. Http://fsweb:r4.fs.fed.us/unit/bpr/iwwi/iwwi.html) These calls were made by the Forest Hydrologist, Soil Scientist and Fish Biologist. The geomorphic integrity was identified as moderate for about 73% of the WCNF watersheds analyzed. Geomorphic integrity was considered high for about 23%, and low for about 4% of the WCNF watersheds (east sides of the Logan and Ogden Districts which drain into the Bear River) analyzed (Table B-3-5). In the Colorado River Drainage all of the 6th level HUCs were "moderate" (Table B-3-5).

11. **Water Quality Integrity:** Each 6th-field subwatershed was rated for the water quality of its segments. This information was collected as part of the Inland West Watershed Analysis and was obtain on 9 November 2000 from. Http://fsweb:r4.fs.fed.us/unit/bpr/iwwi/iwwi.html) The calls were made by the Forest Hydrologist, Soil Scientist and Fish Biologist.

Table B-3-5. Geomorphic integrity, watershed vulnerability and water quality ratings as developed for the Wasatch-Cache National Forest, as part of the Inland West Watershed Initiative.

Rating	Geomorphic Integrity	Water Quality	Watershed Vulnerability
Forest Wide			
Low	4%	14%	9%
Moderate	73%	80%	71%
High	23%	6%	20%
Bonneville Drainage			
Low	5%	16%	10%
Moderate	67%	77%	67%
High	28%	7%	22%
Colorado Drainage			
Low	0%	6%	0%
Moderate	100%	94%	89%
High	0%	0%	11%

The water quality integrity was identified across the Forest. Minor parts of stream, segment miles are damaged across the Forest (80%, Table B-3-5). About 14% (Davis County north along the Wasatch Front) of the WCNF watersheds analyzed were considered to have few if any segments damaged, while about 6% (mostly Upper Provo River watersheds) of the watersheds analyzed were considered to have a major part of the segments damaged. Water quality integrity did not vary greatly between the Colorado and Bonneville basins.

12. **Watershed Vulnerability:** Each 6th level HUC was rated for its inherent vulnerability to disturbance. This information was collected as part of the Inland West Watershed Analysis and was obtain on 9 November 2000 from. Http://fsweb:r4.fs.fed.us/unit/bpr/iwwi/iwwi.html) The calls were made by the Forest Hydrologist, Soil Scientist and Fish Biologist.

    Across the Forest, 71% of the Subwatersheds (6th level HUC) were rated as moderate Watershed Vulnerability. Twenty percent of the Forest had major parts (20%) of the watershed in sensitive lands include, the Bear River, Box Elder Creek Drainage, the Wasatch Front in Davis County, and Mill Creek Drainage.

Step 3(b) Species Status

Because there are no quantitative models that completely represent risks to salmonid populations (McElhany et al. 2000), the viability assessment that follows in Step 4 is based on a qualitative analysis of risks and threats. The datasets used for the analysis are described below.

Step 3(b)(i)Extinction Risk:

Extinction risks are considered those items imposed by the nature of the environment and population. Although the impact may be influenced by man these are considered biological constraints. Extinction risk factors were reviewed and documented through use of local resources. Extinction risk factors include temporal variability, population size, growth and survival, and isolation at the 6th HUC level (Figure B-3-8). Replication and synchrony at the 4th HUC level, where appropriate for an assumed metapopulation (Rieman, B. D. Lee, J. McIntyre, K. Overton and R. Thurow 1993) were also considered extinction risk factors (Figure B-3-8). The following six extinction risk factors were identified by the National Marine Fisheries Service for the viability of evolutionarily significant units of Pacific salmonids (McElhany et al.2000). Conceptually they can be applied to any aquatic species.

Figure B-3-8. Factors included in the four extinctions risk associated with the 6th level HUCs.

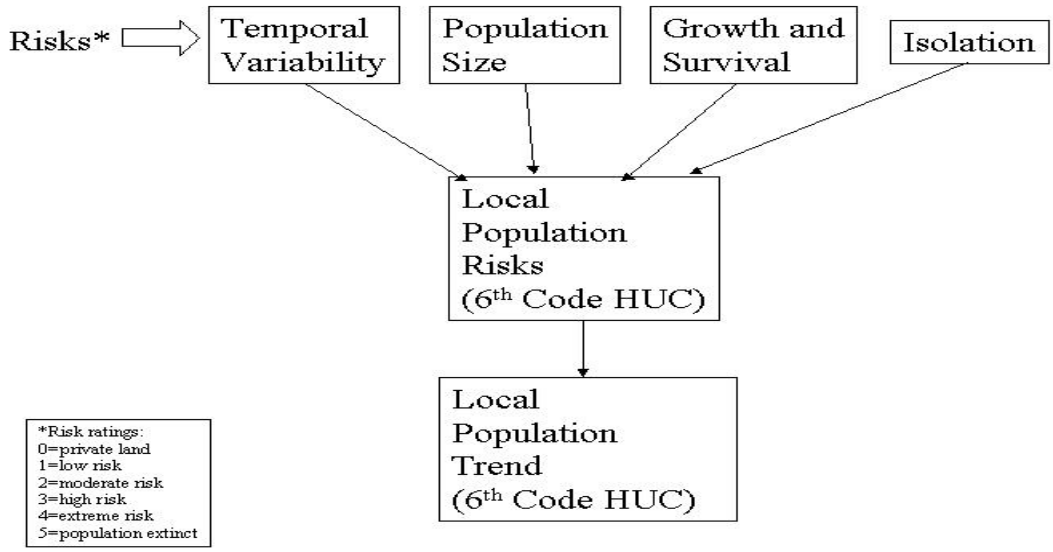
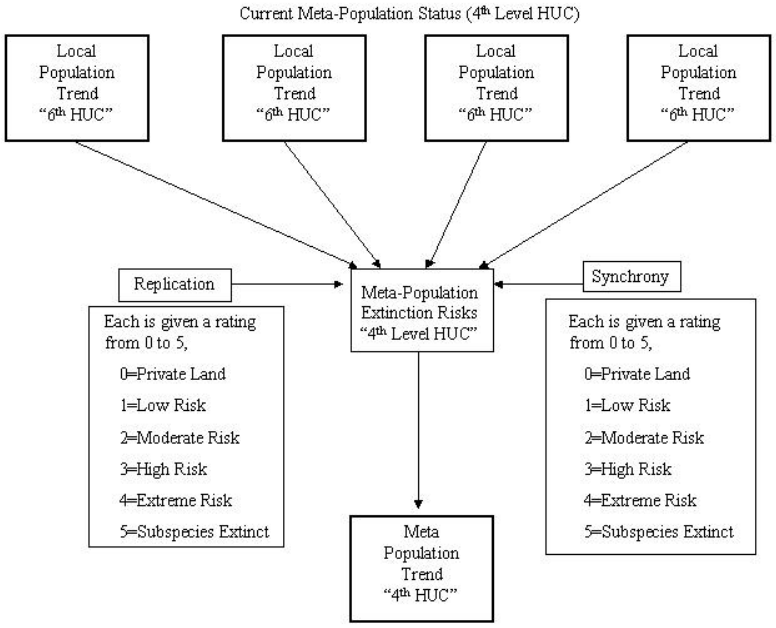


Figure B-8-9. Factors included in the four extinctions risk associated with the 6th level HUCs.



1. **Population Size:** Population size addresses the current population size and age structure. The greater the number of breeding adults, the less risk of extinction there is. Population size, density dependent factors (e.g. sex ratios, etc.) and genetic diversity are critical risk factors (McElhany et al. 2000) that directly relate to population size. NMFS (McElhany et al. 2000) also stresses the importance of building in a margin of error on population size calls. Populations should on average be able to replace themselves and should not exhibit declines in abundance that span multiple generations (McElhany et al. 2000).

2. **Growth and Survival:** Habitat quality is evaluated by the ability to meet all of the life history needs and maintain good juvenile and adult survival. The channel is stable with minimum sediment inflow. Habitats are recognized as being dynamic, but they should not be decreasing either in total size or number of habitat patches (McElhany et al. 2000). Habitat patches are those areas that provide important habitat for a population of fish (for example rearing habitat or spawning habitat).

3. **Isolation:** Populations are reviewed for their ability to commingle with other populations and expand into vacated or new areas. This affects the potential for reestablishing lost or diminished populations as well as the potential for genetic interchange to maintain the genetic variability of a metapopulation.

4. **Replication:** The number of populations that exist within a potential metapopulation, allow for a variety management options to reestablish populations if one goes extinct. Widespread replication of populations reduces the possibility that a single uncharacteristic event will cause the population to go extinct, while geographically close populations allow metapopulation dynamics to function (McElhany et al. 2000).

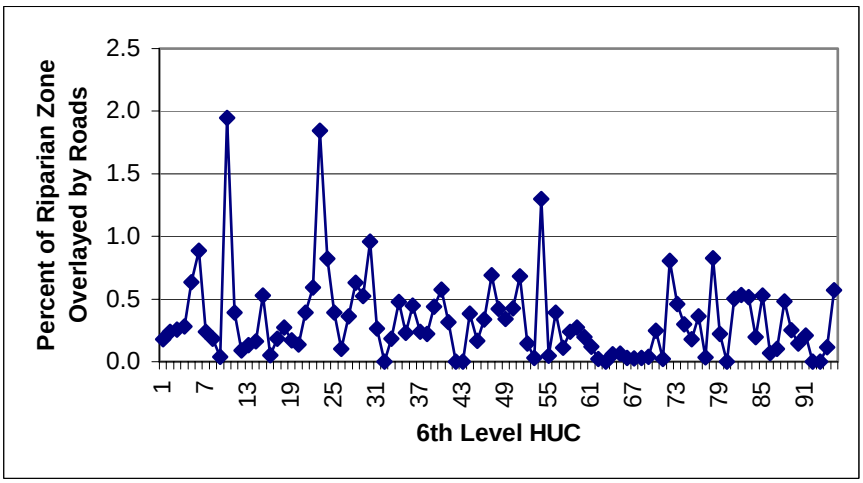
5. **Synchrony:** To best provide for the long term survival of populations within a 4th level HUC, environmental variation needs to be low and habitats complex. If populations within a metapopulation fluctuate together their ability to persist amid environment change decreases. Concern over environment variation was also identified by NMFS (McElhany et al. 2000).

Step 3(b)(ii) Threats:
For this assessment, threats are considered those management activities that would result in an increased level of extinction risk, as identified Step 3(b)(i). In addition, the term threat was used to distinguish between those broad factors cited by Rieman et al. (1993) and the more specificland management actions initiated locally. A number of threats were reviewed and the most critical ones identified and used in this analysis. The primary threats identified were roads, trails, motorized trails, grazing, developed recreation sites and special uses authorized in riparian zones on National Forest System Lands. Timber harvest allocations and the presence of non-native fish have also been included in the analysis. Factors eliminated from review because site specific environmental analysis would be required prior to implementation included gas and oil drilling, dams and diversions, non-timber or grazing forest products, wilderness, and reseeding and planting.

The analyzed threats identified below, primarily affect habitat conditions which in turn affect population size, complexity to withstand temporal variability in habitats, habitat support for growth and survival and, if passage and connectivity are an issue, isolation of a population. If fish passage is an issue in some road systems, then the metapopulation may be affected (i.e. through effects to isolation and replication). The metapopulation would also be affected by changes in habitat because the potential loss of complexity reduces the ability of the habitat to support its metapopulation through changing conditions and stochastic events.

1. Roads Within 300 Feet of a Stream: Roads within 300 feet of a stream were included in the analysis because they eliminate the natural function of the vegetation and prevent the filtering of water as it moves to the channel. This increases sedimentation in the stream channel, alters the macroinvertebrate community and causes direct and indirect mortality to fish. Roads also provide direct routes for sediment to enter the stream.

The roads layers, in the Forest's database, were used to identify existing Forest Service classified and other non-Forest Service (e.g. city, county, state) roads. The percent of the 300 feet from the stream that has been taken out of properly functioning condition because of roads, on the Forest, ranged from 0 to approximately 2 percent (Figure B-3-10 and B-3-11). This database also identifies maintenance level. The Forest does not currently have an inventory of unclassified roads, and therefore, geographic data for these was not available for this analysis. Roads were assumed to be 12 feet wide for the analysis. It is recognized that a number of paved roads are wider, but the barrow non-paved sections would be close to the 12 feet.



FigureB-3-10. Percent of riparian zone that has been taken out of natural functioning condition by roads within 6th level HUCs on the Wasatch-Cache National Forest, Utah and Wyoming. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.

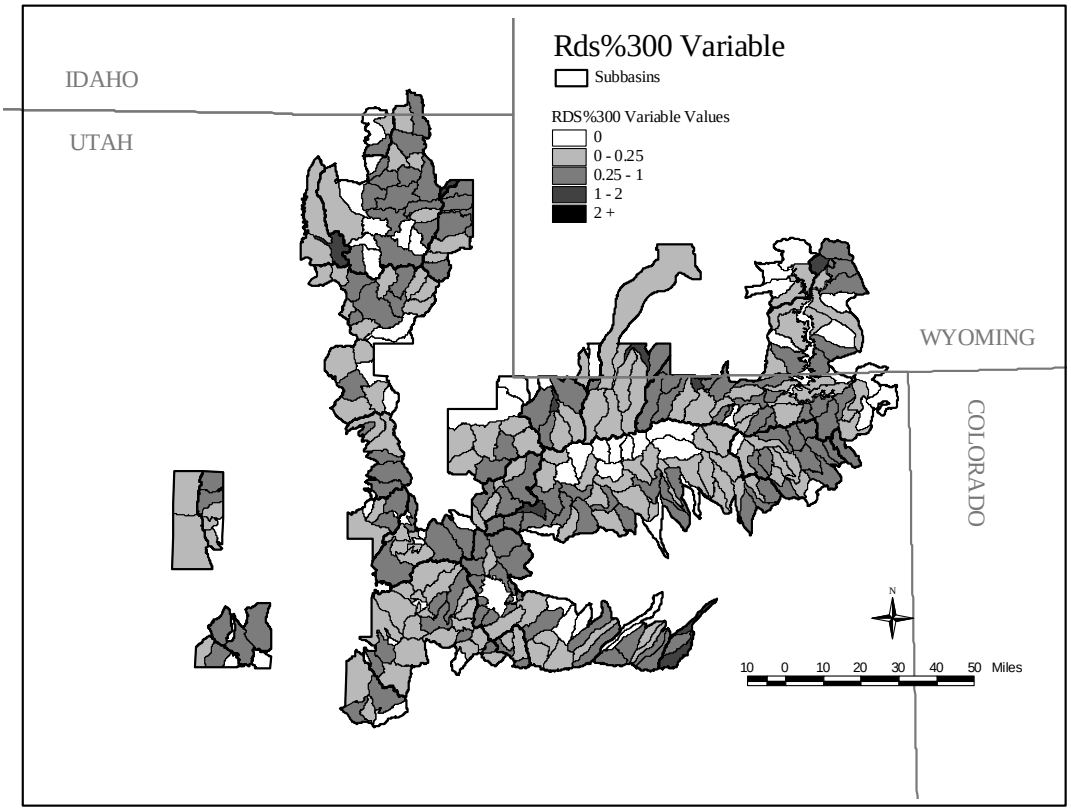


Figure B-3-11. Percent of the land within 300 feet of a stream that has been taken out of naturally functioning condition by construction of a road, by 6th level HUCs. These calculations were done for the Uinta, Ashley, and Wasatch-Cache National Forests. Calculations were only completed on National Forest lands within 6th level HUCs although full HUCs are displayed.

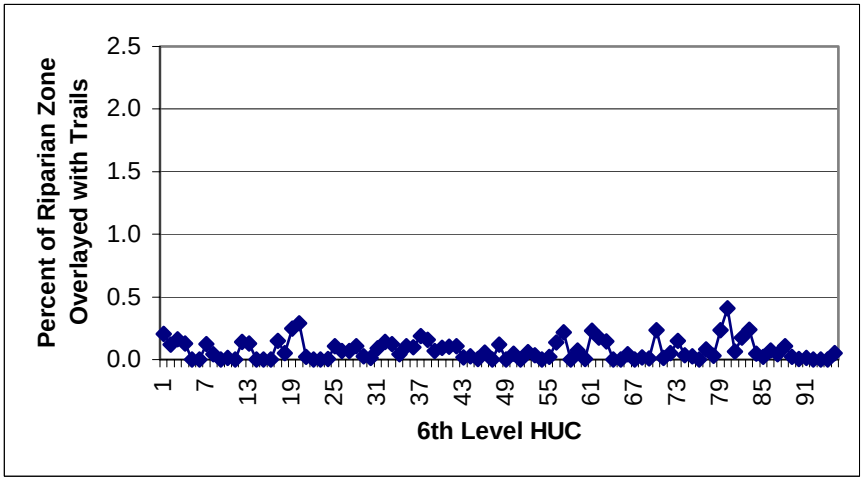
Roads also affect fish passage. As roads cross streams, populations can become cutoff from habitat upstream of the crossing. The potential for these impacts was identified in the Wasatch-Cache National Forest's Road Analysis. There has not been broad enough inventory work on this matter to validate these potential problems.

2.Non-motorized Trails Within 300 Feet of a Stream: Non-motorized trails within 300 feet of a stream were included in the analysis because they eliminate the natural function of the vegetation and prevent the filtering of water as it moves to the channel. This increases sedimentation in the stream channel, alters the macroinvertebrates community and causes direct and indirect mortality to fish. Trails also provide direct routes for sediment to enter the stream.

The non-motorized trails layer from the Forest's GIS database was used to identify existing non-motorized trails. The percent of land 300 feet from the stream that has been taken out of naturally functioning condition because of non-motorized trails, on the Forest, ranged from 0 to approximately 0.5% Trails were assumed to be four feet

wide for the analysis and include developed and maintained trail. This analysis does not include the user-defined trails.

Figure B-3-12. Percent of riparian zone that has been taken out of natural functioning condition by non-motorized trails within 6th level HUCs on the Wasatch-Cache National Forest, Utah. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.



3. Motorized Trails Within 300 Feet of a Stream: Motorized within 300 feet of a stream were included in the analysis because they eliminate the natural function of the vegetation and prevent the filtering of water as it moves to the channel. This increases sedimentation in the stream channel and alters the macroinvertebrates community and causes direct and indirect mortality to fish. Trails also provide direct routes for sediment to enter the stream.

The motorized trails layer from the Forest's GIS data base was used to identify existing motorized trails. Trails were assumed to be 4 feet wide for the analysis and include developed and maintained trail. This analysis does not include the user-defined trails.

Figure B-3-13. Percent of the land within 300 feet of a stream that has been taken out of naturally functioning condition by construction of a trail, by 6th level HUCs. These calculations were done for the Uinta, Ashley Wasatch-Cache National forests. Calculations done only for National Forest lands within 6th level HUCs although full HUCs are displayed.

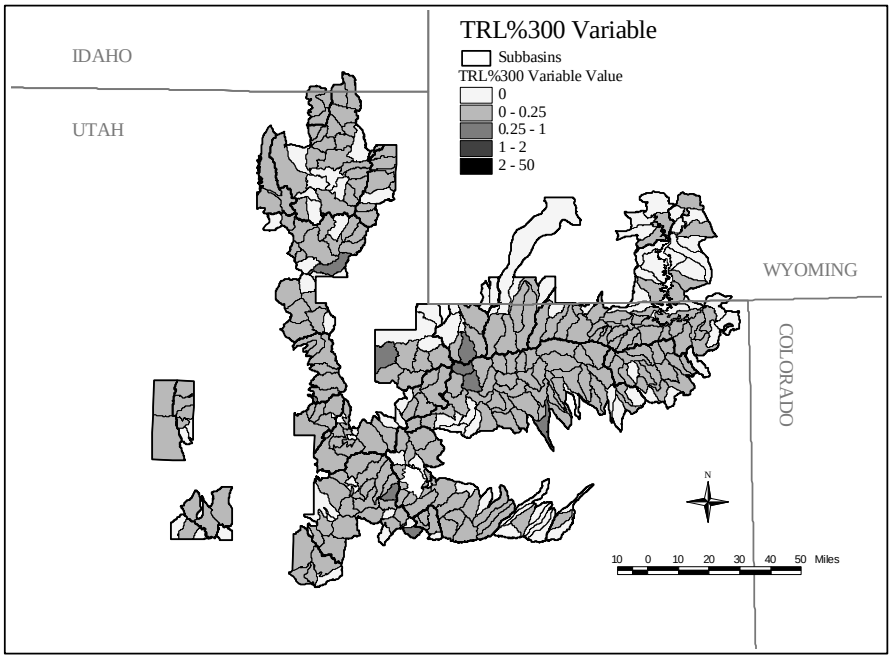


Figure B-3-14 Percent of riparian zone that has been taken out of natural functioning condition by motorized trails within 6th level HUCs on the Wasatch-Cache National Forest, Utah. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.

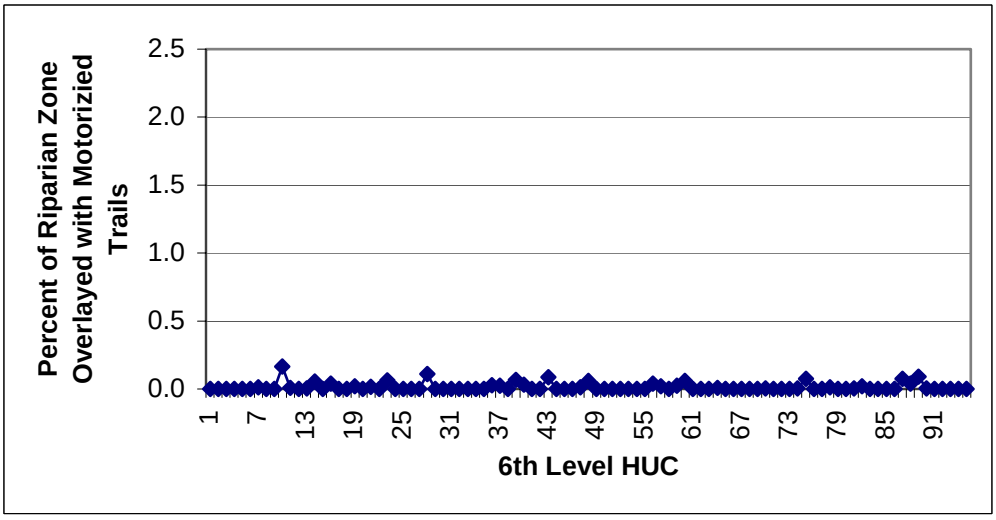
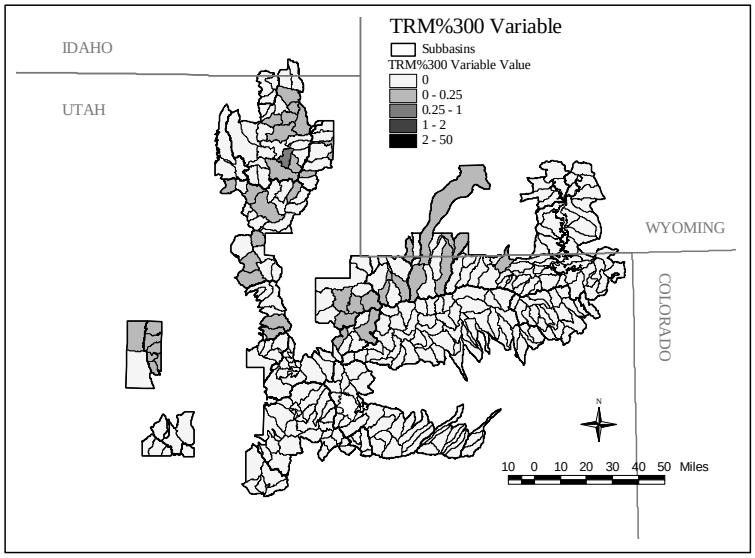


Figure B-3-15. Percent of the land within 300 feet of a stream that has been taken out of naturally functioning condition by construction of a motorized trail, by 6th level HUCs. These calculations were done for the Uinta, Ashley Wasatch-Cache National forests. Calculations done only for National Forest lands within 6th level HUCs although full HUCs are displayed.



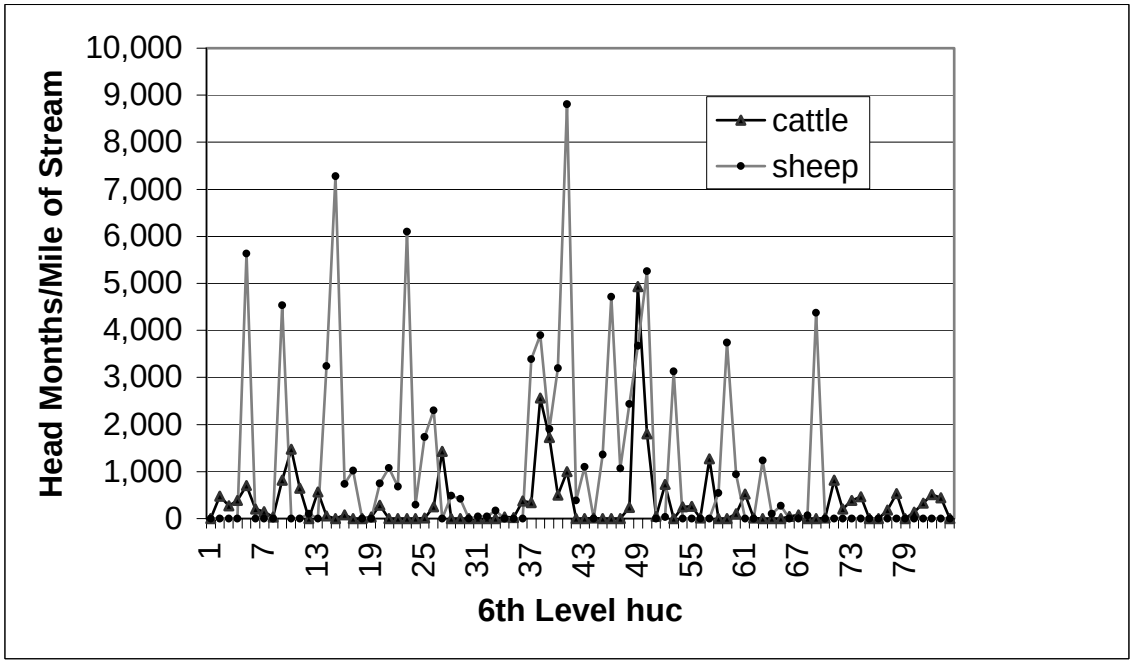
4. Suited Timber Harvest Lands Within 300 feet of a Stream: Timber removal along a stream course precludes large woody debris from entering the stream and increases the complexity of the fish habitat. Timber harvest also reduces shading and increases water temperatures. Sediment runoff can also occur in areas where harvest has occurred.

Suited timber lands where timber harvest may occur (management prescription 5.2) that are within 300 feet of a stream course were analyzed.

5. Domestic Livestock Grazing: Domestic livestock grazing can affect fish and their habitat by reducing overhanging cover, destabilizing banks, increasing sedimentation and trampling of redds (Chase, 2000).

Boundaries of allotments, allotment status (active or vacant), and type of livestock authorized (sheep or cattle) were reviewed and considered. The number of livestock per mile of stream within each 6th level HUC was generated using the Forest's GIS system, and also in the INFRA database.

Figure B-3-16 Head months per mile of stream in 6th level HUCs on the Wasatch-Cache National Forest, Utah. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.



6. Non-native Fish: The distribution of non-native fish was also viewed as a threat to the Bonneville and Colorado River cutthroat trout. Non-native fish compete directly with the cutthroat trout for habitat and food. . Exotic species pose potential threats to genetic purity of the populations through hybridization and introgression.

7. Develop Recreation Sites Within 300 Feet of a Stream: Developed recreation sites within 300 feet of a stream were included in the analysis because they can eliminate the natural function of the vegetation and prevent the filtering of water as it moves to the channel. This increases sedimentation in the stream, alters the macroinvertebrate community and causes direct and indirect mortality to fish. Stream access trails also provide direct routes for sediment to enter the stream.

The recreation layer from the Forest's GIS database was used to identify existing developed and special use sites. The percent of land 300 feet from the stream that has been taken out of naturally functioning condition because of developed use sites on the Forest, ranged from 0 to approximately 28% (Figure B-3-17 and Figure B-3-18).

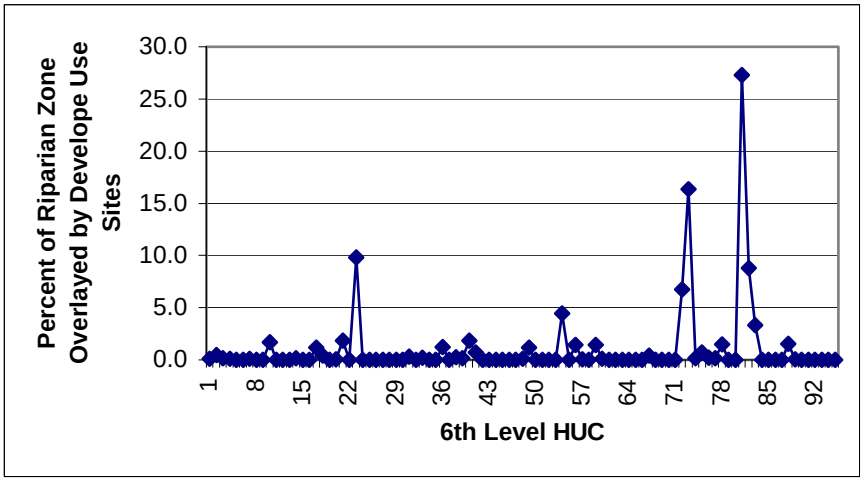


Figure B-3-17. Percent of riparian zone that has been taken out of natural functioning condition by developed use sites within 6th level HUCs on the Wasatch-Cache National Forest, Utah and Wyoming. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.

8. Special Use Sites Within 300 Feet of a Stream: Special use sites within 300 feet of a stream were included in the analysis because they eliminate the natural function of the vegetation and prevent the filtering of water as it moves to the channel. These sites can also decrease riparian vegetation. This increases sedimentation in thestream, alters the macroinvertebrate community and causes direct and indirect mortality to fish. Stream access trails from these sites can also provide direct routes for sediment to enter the stream.

The recreation layer from the Forest's GIS database was used to identify existing developed and special use sites. The percent of land 300 feet from the stream that has been taken out of naturally functioning condition because of special use sites on the Forest ranged from 0 to approximately 2.6 (Figure B-3-19 and B-3-20).

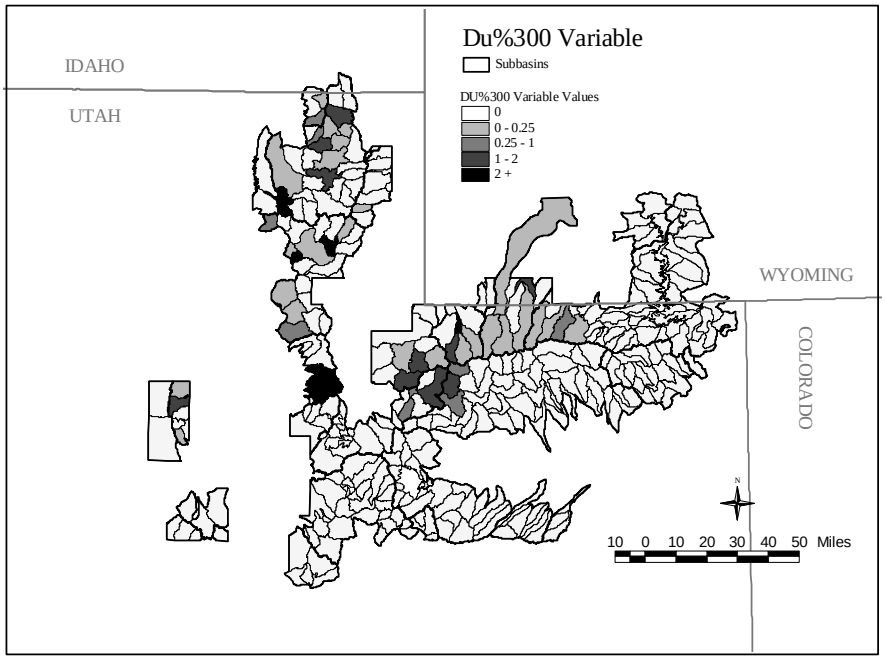


Figure B-3-18. Percent of land within 300 feet of a stream that has been taken out of naturally functioning condition by construction of developed uses (trail heads, campgrounds, picnic area etc.), by 6th level HUCs. These calculations were done for the Uinta, Ashley and Wasatch-Cache National forests. Calculations done only for National Forest lands within 6th level HUCs, although full HUCs are displayed.

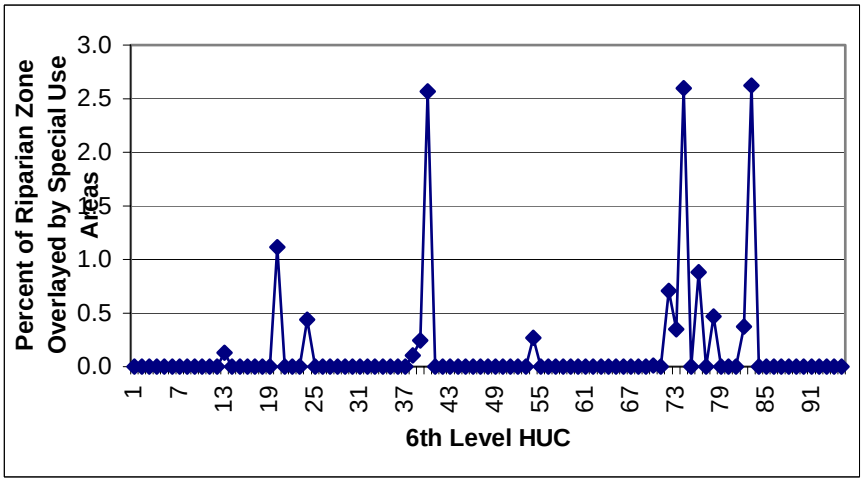


Figure B-3-19. Percent of riparian zone that has been taken out of natural functioning condition by special use sites within 6th level HUCs on the Wasatch-Cache National Forest, Utah and Wyoming. HUCs are in order of drainage starting with the Green River Drainage and ending with the Stansbury Mountains.

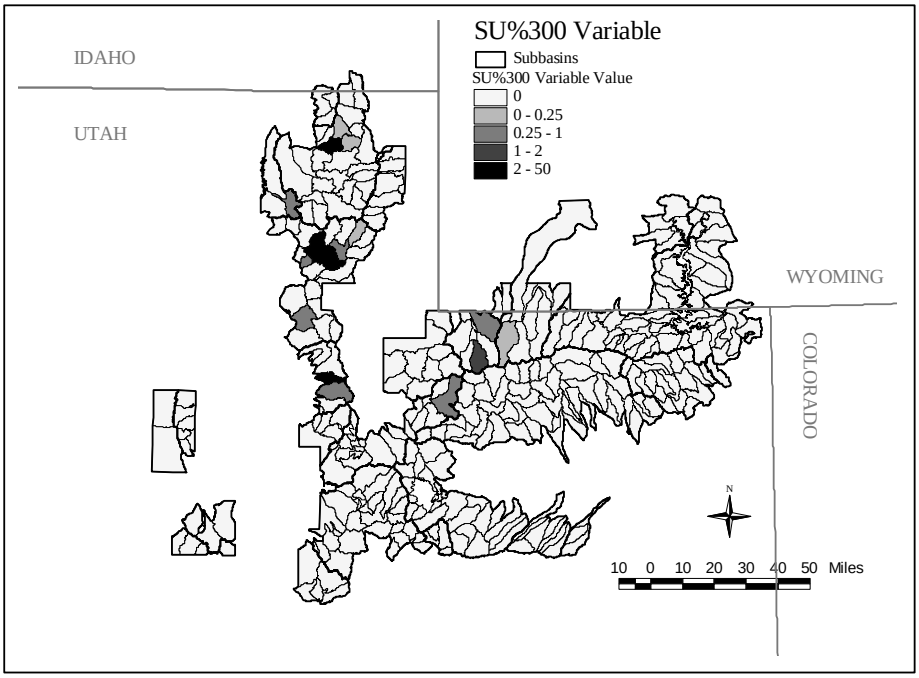


Figure B-3-20. Percent of land within 300 feet of a stream that has been taken out of naturally functioning condition by existing special use facilities (summer homes, ski resorts etc.), by 6th level HUCs. These calculations were done for the Uinta, Ashley Wasatch-Cache National Forests. Calculations done only for National Forest lands within 6th level HUCs although full HUCs are displayed.

Step 4 Assessments for potential extinction

Step 4(a) Potential extinction at the 6th Level HUC

The threats identified in Step 3 along with the extinction risk factors, also in Step 3, were used to identify the potential for extinction of the populations within the 6th code HUC level. Most of the determinations were qualitative using the following basic thought processes:

1. Do we know what the trend has been over the last 15 years? In most cases, the data was not available to make this determination. In areas where trend datawas available (ie. Logan River Drainage), the confidence intervals were large enough to mask any differences that may have occurred over time.

2. Is there an extinction risk, be it (a) Temporal Variability in recruitment or survival, (b) Population Size, (c) Growth & Survival and/or (d) Isolation that is in a high or extreme risk to the level thata 6th code HUC may become vacated of native fish over the next 10 to 15 years?

3. Is there a current threat, be it (a) Grazing, (b) Recreation/Special Uses, (c) Roads and/or trails, (d) Non-native Species, and/or (e) Timber treatment, that is high enough

that a 6th level HUC may become vacated of native fish over the next 10 to 15 years? The assumption is that one threat may be sufficient to cause a population to vacate a 6th level HUC. This also takes into account the Inland West Watershed Initiative information of Geomorphic Integrity, Water Quality, and Watershed Vulnerability.

Data from the above factors have been combined into a single table for easier comparison and analysis. For the analysis, the following steps were taken:

a. All of the risk factors for the 6th level HUCs were combined into a single factor. Generally these were averaged unless local information was known and could be combined with the averaged risk factor to more accurately reflect the overall risks.

b. The potential impacts from roads, motorized trails and trails were summed into one threat factor.

c. Developed and special uses were summed to generate one threat factor.

d. Threats for grazing and non-native fish were left separate with cattle and sheep grazing densities both being identified.

e. Trend for 6th level HUCs were then identified. An upward trend was identified where addition habitat had been added or habitat improvements had occurred. If a stream had been treated to remove non-native fish, the general trend was viewed as increasing. A downward trend was identified if the population had an overall risk rating of 3 or 4,had lost potential functioning condition in over 2.5% of the huc's riparian zone, and/or had two or more non-native fish with potential interbreeding. The population was considered stable if there was no evidence of major change from the last Forest Planning period.

It should be recognized that with any data set there are limitations, shortcomings, and errors. Risk ratings were used to describe the 6th code HUC area as a whole**,** although, watersheds and their associated environmental conditions vary greatly. One stream may run north while another stream runs to the west**,** or one stream may have a road adjacent to it while another may be in wilderness. Fish populations may reflect these differences. As a result, their risk rating may differ greatly between streams and even between stream sections if evaluated at that level. That level of analysis is beyond the 6th level HUC area that is being used for the Forest Planning effort. The results of the analysis at the 6th level HUC are presented in Table s B-3-6 through B-3-17.

Step 4(b) Likelihood of persistence of the metapopulation for 15 and 100 years

The trend and potential for extinction, assessment at the 6th level HUC was combined with the replication risk factor and synchrony risk factor at the 4th level HUC to make a

determination on the likelihood of persistence of the metapopulation for 15 and 100 years. For this assessment, the metapopulation was assumed to be those populations within the 4th level HUC that could possibly have connectivity. Persistence at 15 and 100 years was assumed if any of the individual populations were expected to persist for that time period. Changes in the risk factors with expected changes in the 6th level HUC populations were described.

The likelihood of persistence is described below for each of the metapopulations (4th level HUC). Identification of the more critical threats is also made.

COLORADO RIVER CUTTHROAT TROUT

Henrys Fork Drainage

15 Years It is believe that these populations of Colorado River cutthroat trout, in the Henrys Fork Drainage (HUC 14040106) will persist over the next 15 years based on the limited risks and moderate threats (Figure B-3-21). The replication risk is 2, with multiple strong populations across the north slope of the Uinta Mountains. The synchrony risk is 2, with populations being found in moderate quality complex habitats.

Risks and Threats of Concern The frequency and potential of large-scale uncharacteristic events is assumed to be moderate, with fire being the major concern. The primary concern in the drainage is the movement of non-native fish coming upstream (Table B-3-6). Grazing in the upper Henrys Fork is also a concern, with a large number of head months per mile of stream occurring in the 6th level HUC. The availability of water in the drainage may reduce the potential impact from grazing.

100 Years It is anticipated that the Colorado River cutthroat trout will persist over the next 100 years also. Again the risks and threats are expected to remain constant. At this 4th level HUC, it is likely that we may loose some of the range currently occupied by Colorado River cutthroat trout. However, based on the limited risks and moderate threats, it is believe that they will continue persist in the 4th level HUC.

Blacks Fork Drainage

15 Years It is believe that these populations of Colorado River cutthroat trout will persist over the next 15 years in the Blacks Fork Drainage, based on the limited risks and moderate threats (Figure B-3-22). The replication risk is 2 with major populations in Smiths Fork, Blacks Fork, Brush Creek, and Sage Creek. The synchrony risk is 2 with impacts from historic tie hacking continuing to affect fish habitat. The frequency and potential of large-scale uncharacteristic events is assumed moderate.

Risks and Threats of Concern The primary concern in the drainage is the upstream movement of non-native fish. This concern has been addressed with the installation of migration barriers in some of these drainages. Grazing in the Gilbert Creek Drainage is also a concern with a large number of head months per mile of stream occurring in the 6th

level HUC (Table B-3-6). The availability of water in the drainage may reduce the potential impact from grazing.

100 Years It is anticipated that the Colorado River cutthroat trout will persist over the next 100 years also. Again the risks and threats are expected to remain constant.

Muddy Creek

15 Years The persistence of Colorado River cutthroat trout in the Muddy Creek Drainage, over the next 15 years, will be dependent on what occurs off National Forest lands (Figure B-3-22). There is very limited mileage of habitat on National Forest lands. The replication risk is 4 with a very limited population on the Wasatch-Cache National Forest. The synchrony risk of 3 is that the fish population could be affected by an uncharacteristic event.

Risks and Threats of Concern Isolation is the primary risk of concern for the WCNF population. The risks and threats are expected to remain constant (Table B-3-7).

100 Years If no changes occur off National Forest Lands, it is anticipated that this population will persist over the next 100 years.

Duchesne River

15 Years In surveys conducted in 2001 no cutthroat trout were found in the upper Duchesne River Drainage on the Wasatch-Cache National Forest. This upper portion of the river contained only rainbow and brook trout. The surveys conducted in 2001 were the first know survey conducted in the upper portion of the drainage (Figure B-3-23). The replication risk is 5 with no populations on the Wasatch-Cache National Forest. The synchrony risk is 5 with no populations on the Wasatch-Cache National Forest.

Risks and Threats of Concern The assumed risks and threats are low to moderate and expected to remain constant (Table B-3-8).

100 Years With no population currently occurring on the Forest, no population can persist over the next 100 years unless a population is transplanted into the area.

Upper Bear River

15 Years It is believed that the Bear River populations of Bonneville cutthroat trout, on the Wasatch-Cache National Forest, will persist over the next 15 years based on the limited risks and moderate threats (Figure B-3-24). The replication risk is 2 with metapopulations in Mill, Stillwater and the Woodruff Creek drainages. The synchrony risk was 2 with most of the environment being stable and the habitat is very complex across the 4 HUC. The frequency and potential of large-scale uncharacteristic events is assumed low. It is expected that the risks and threats will increase over the next 15 years as more land is sold for development.

Risks and Threats of Concern The primary concerns in the drainages are the non-native fish and some habitat impacts from historic tie hacking and grazing (Table B-3-9). Grazing in the Woodruff and the West Fork of the Bear drainages are also a concern with a large number of head months per mile of stream occurring in the 6th level HUC.

100 Years It is anticipated that the Bonneville cutthroat trout will persist over the next 100 years also. The risks and threats are expected to increase over the next 100 years as demands for recreational opportunities and water increases.

North Cache Valley

15 Years It is believed that most of the populations of Bonneville cutthroat trout will persist over the next 15 years even though there are a limited number of isolated populations. The High Creek population is expected to be lost because of its limited size and the current interbreeding which is occurring. When sampled in 1997, no fish had the appearance of being pure cutthroat trout. All fish appeared to be crossed with rainbow trout. Follow up surveying in 1998 also found no fish which appeared to be pure. The replication risk is 4, with very limited populations on the Wasatch-Cache National Forest. The synchrony risk was 3 where habitat could be affected by uncharacteristic natural events across the 4 HUC.

Risks and Threats of Concern The primary concerns in the drainages are the limited small populations with no connection between drainages and continued expansion of the population along the Wasatch Front.

100 Years It is anticipated that the Bonneville cutthroat trout will not persist in this 4th level HUC over the next 100 years because of continued declines in population size and continued lack of connectivity between drainages. This is because demands for recreational opportunities, water and general population growth are expected to increase.

West Wellsville

This 4th level HUC will remain without cutthroat trout.

South Cache Valley

15 Years It is believed that the Bonneville cutthroat trout will persist over the next 15 years based on the limited risks and moderate threats in the 4th level HUC. The replication risk is 2, with major populations in the Logan and upper Blacksmith Fork Rivers. The synchrony risk was 2 with good habitat complexity and environmental variation across the 4th level HUC. The frequency and potential of large-scale uncharacteristic events is assumed low. It is anticipated that over the next 15 years the population in Saddle Creek will be lost. It is believed that this population will be lost because of the cumulative impacts of the natural lack of water found in the area,

environmental factors (i.e. drought) and habitat impacts in the water including roads and grazing. This population is currently excluded from cattle grazing through the use of letdown fences. Cattle have been known to trespass in the area. The population is currently experiencing year class failures and is confined to a very small segment of the stream.

Risks and Threats of Concern The primary concerns in the drainages are the major highway along the river and grazing. Grazing in the Right Hand Fork, Temple Fork and Tony Grove HUCs in the Logan River Drainage and Saddle Creek and the Left Hand Fork in the Blacksmith Fork drainages are of concern. The risks and threats are expected to increase over the next 15 and 100 years as demands for recreational opportunities and water increases.

100 Years It is anticipated that the Bonneville cutthroat trout will persist over the next 100 years. The population in the Left Fork Blacksmith Fork is expected to be lost over the next 100 years because of the threats associated with the 6th level HUC. There is a road adjacent to the river up the entire length of the stream. There are also two non-native fish in the stream. Sedimentation from the road and adjacent side hills can reach the stream. Grazing numbers are the second highest in this HUC and recreational use is high is this drainage. The population is also isolated from other populations.

Weber River

15 Years It is believed that the Bonneville cutthroat trout will persist over the next 15 years based on the limited risks andthreats in the 4th level HUC. The replication risk is 2. Major populations occur in the upper Weber, N.F. Ogden and Beaver Creek. All of these populations are isolated from each other but do contain a number of connected miles of stream habitat. The synchrony risk was 2 with some evidence of regional decline with good habitat complexity and environmental variation across the 4th level HUC. The frequency and potential of large-scale uncharacteristic events is assumed low. The population in the South Fork of the Weber River is expected to be lost over the next 15 years.

Risks and Threats of Concern The primary concerns in these drainages are non-native fish. The risks and threats are expected to increase over the next 15 to 100 years as demands for recreational opportunities and water increase.

100 Years It is anticipated that the Bonneville cutthroat trout will probably decline but not be lost over the next 100 years.

Ogden River – Wasatch Front

15 Years It is believed that the Bonneville cutthroat trout will persist over the next 15 years in most of these 6th level HUCs, based on the limited risks and limited threats in the 4th level HUC. The replication risk is 3 with mostly small, isolated populations of

cutthroat trout. The synchrony risk was 2 with good habitat complexity and low environmental variation across the 4th level HUC. The frequency and potential of large-scale uncharacteristic events is assumed low.

Risks and Threats of Concern The primary concerns in these drainages are non-native fish and the isolated nature of the populations. During the 1982-83 winter, excessive snow accumulated across the State of Utah. During spring runoff, debris flows occurred in a number of these smaller canyons. Pre and post surveys indicate that cutthroat trout were lost from Parish and Willard Creek during this period. Historically, these streams may have connected to others allowing for repopulation. Most of these small headwater streams have been diverted at the Forest boundary preventing recolonization. The risks and threats are expected to increase over the next 15 to 100 years as demands for recreational opportunities and water increases.

100 Years It is anticipated that the Bonneville cutthroat trout, in the 4th level HUC will probable decline over the next 100 years, but will not be lost. Some of the smaller populations are likely to be lost over the next 100 years due to natural events.

Salt Lake County Drainages

15 Years There are four known populations of cutthroat trout in the 4th level HUC with two of these being found on National Forest Lands. All of these populations: Little Cottonwood, Deaf Smith, Parleys and Red Butte Creeks are limited in size. None of these populations are connected. The replication risk is 3, with populations being isolated with no potential for interbreeding. The synchrony risk is 2, with populations found in moderately complex habitats

Risks and Threats of Concern The primary concerns for these populations areisolation and small population size.

100 Years The population in Red Butt is expected to persist due to the habitat being protected, and no fishing or recreation. The population in Parleys Creek is also expected to persist over the next 100 years, although only a limited number of fish in this population are on the WCNF. The population inLittle Cottonwood Creeks is not likely to persist for 100 years because of inbreeding impacts and a high risk from environmental conditions. Little Cottonwood Creek currently has water chemistry problems, primarily heavy metals. It is undetermined as to the source of these heavy metals whether they are from natural sources or historic mining in the drainage. The Little Cottonwood Creek population is very isolated and limited in distribution. A toxicant spill from one of the ski resorts or private cabins could easily cause the loss of this population.

East Side Stansburys

This 4th level HUC will remain without cutthroat trout.

West Side Stansburys:

This 4th level HUC will remain without cutthroat trout.

Provo River Drainage

15 Years There are four known populations of Bonneville cutthroat trout in this 4th level HUC on the Wasatch-Cache National Forest. These are Soapstone, Rock, Boulder creeks and a population that is found in the upper mainstem Provo River as evidence by the capture of a few isolated cutthroat trout. There is a very limited understanding of the upper mainstem Provo River population on National Forest lands. The populations are considered isolated with no large fluvial fish being captured during surveys. The populations in Soapstone and Rock creeks are not expected to persist over the next 15 years because of the limited population size and the lack of connectivity. In 2001 and 2002, Soapstone Creek was dry by late June. This would have caused the lost of year classes during these years. Rock Creek, when surveyed in 1995 had a population estimate of one fish collected in 89 meters of stream. The stream itself is very small. If the mainstem Provo River had a population of cutthroat trout in it these two feeder stream may be more likely to survival the natural low water years and isolation. A population is not believed to exists there. The replication risk is 3 with a very limited number of populations of which allareisolated. The replication risk is 2 with the existing populations being very dispersed.

Risks and Threats of Concern Water demand and recreation use is expected to continue to increase.

100 Years The population in Boulder Creek is expected to remain viable for the next 100 years. The Bonneville cutthroat trout in the 4th level HUC are viewed as viable over the next 100 years because the strongest population is expected to persist.

Table B-3-6. Risks and threats associated with the Henry Fork Drainage (HUC-14040106) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Upper Burnt Fork 140401060601	2,2,2	1	1	1	2 subwatersheds with no connection	1 very limited isolation good complexity	0.383142	0.111691	478/0	Brook trout	Flat
East &Middle Fork Beaver140401060602	2,2,2	1	2 MF= 64/mile	2	4 isolated	3	0.357808	0.448796	273/0	Rainbow, Brook trout	Down
West Fork Beaver 140401060603	3,2,2	1	1	1	2	2	0.414233	0.161104	383/0	Brook trout	Flat
Upper Henrys Fork 140401060604	2,2,2	1	1	2	2 well connected	2	0.408527	0.115991	699/5,640	Brook trout	Flat
Lost, Spring, Poison creeks 140401060605	2,2,2	1	1 211/mile	2	2 well connected	3 Isolated limited numbers	0.635677	0.000000	204/0	none	Flat
Lower part of Burnt Fork 140401060606	2,1,2	1	1	1	2	2 limited and isolated	0.887314	0.000000	144/0	Brook Rainbow	Down

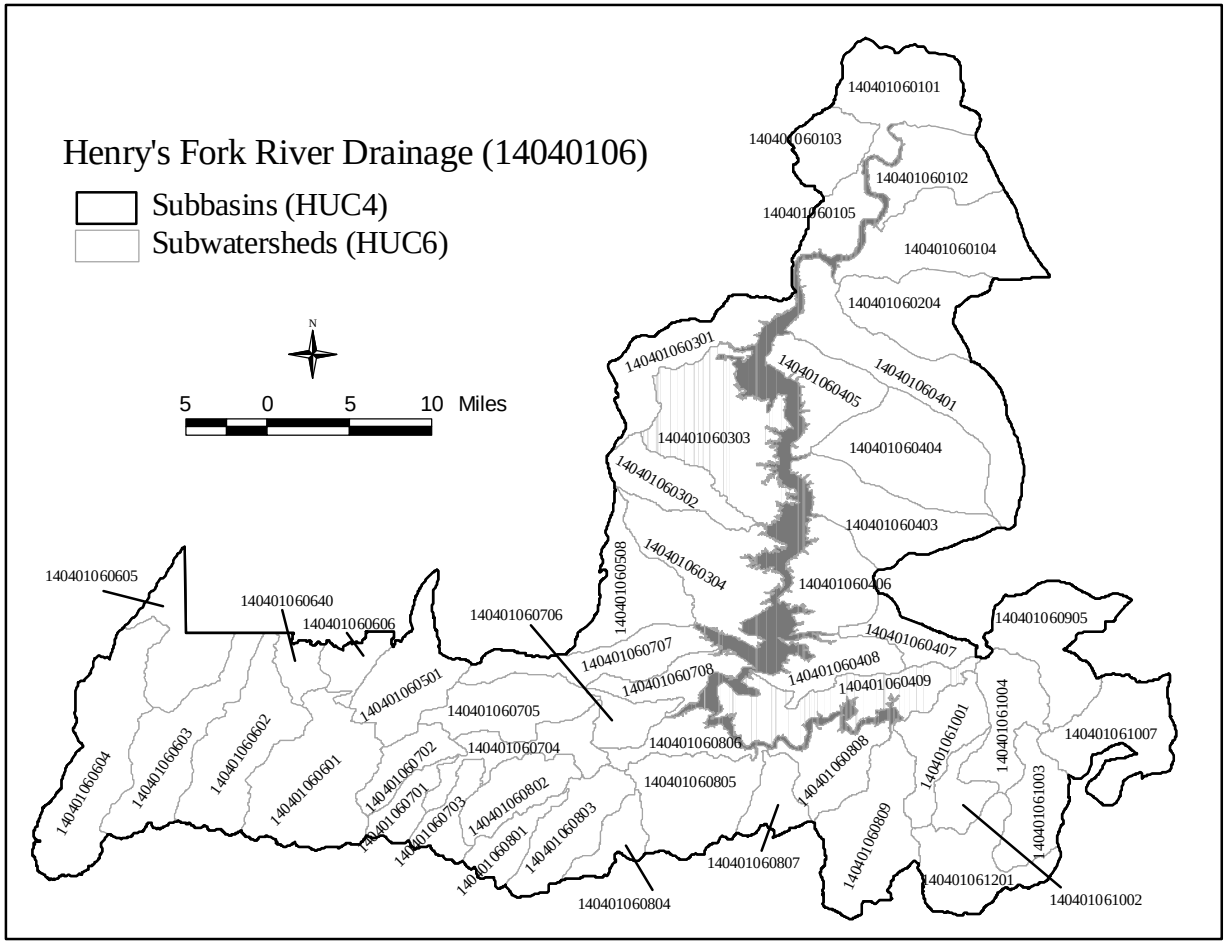


Figure B-3-21. Map of the Henry's Fork River Drainage (4th HUC - 14040106) with 6th level HUCs on the Wasatch-Cache and Ashley National forests.

Table B-3-7. Risks and threats associated with the Blacks Fork Drainage (HUC-14040107) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Gilbert Creek 140401070601	2,3,2	1	2 treated fy2000	2	4	3 migration barrier, limited population	0.372141	0.098862	822/4532	Brook	Up treatment in fy2000
West Fork Smiths Fork 140401070602	3,3,3	1	1 557-1016/mile	2 tie hacking	1 connected stream miles = 16	1 good size and stream mileage	0.227125	0.000000	1477/0	Brook	Flat
Willow Creek 140401070603	3,3,3	3	2	2	4	4 isolation	0.038341	0.000000	648/0		Down
Little Dry Creek 140401070604	2,2,2	5 cutthroat not present	5 cutthroat not present	5 Cutthroat not present	5 cutthroat not present	5 cutthroat not present	2.123823	1.700436	0/99	5 cutthroat not present	Cutthroat not present
Sage Creek 140401070606	2,2,2	3	2	3	4	4	0.398150	0.000000	565/0	None	Flat migration barrier
E. F. Blacks Fork 140401070701	3,2,2	1	1	2	1	1	0.227115	0.005295	61/3240	Brook trout	Flat
W. F. Blacks Fork 140401070702	2,2,2	1	1	2	1	1	0.263057	0.140805	3/7274	Brook trout	Flat
Lower Blacks Fork River 140401070703	3,2,2	2	2	2 tie hacking	1 good connection	2	0.215440	0.149231	79/742	Brook trout	Down
Little West Fork Blacks Fork 140401070760	3,2,2	2 low diversity	1 998/mile	2 tie hacking	3 Not connected	3	0.528278	0.000000	0/1019	None	Flat

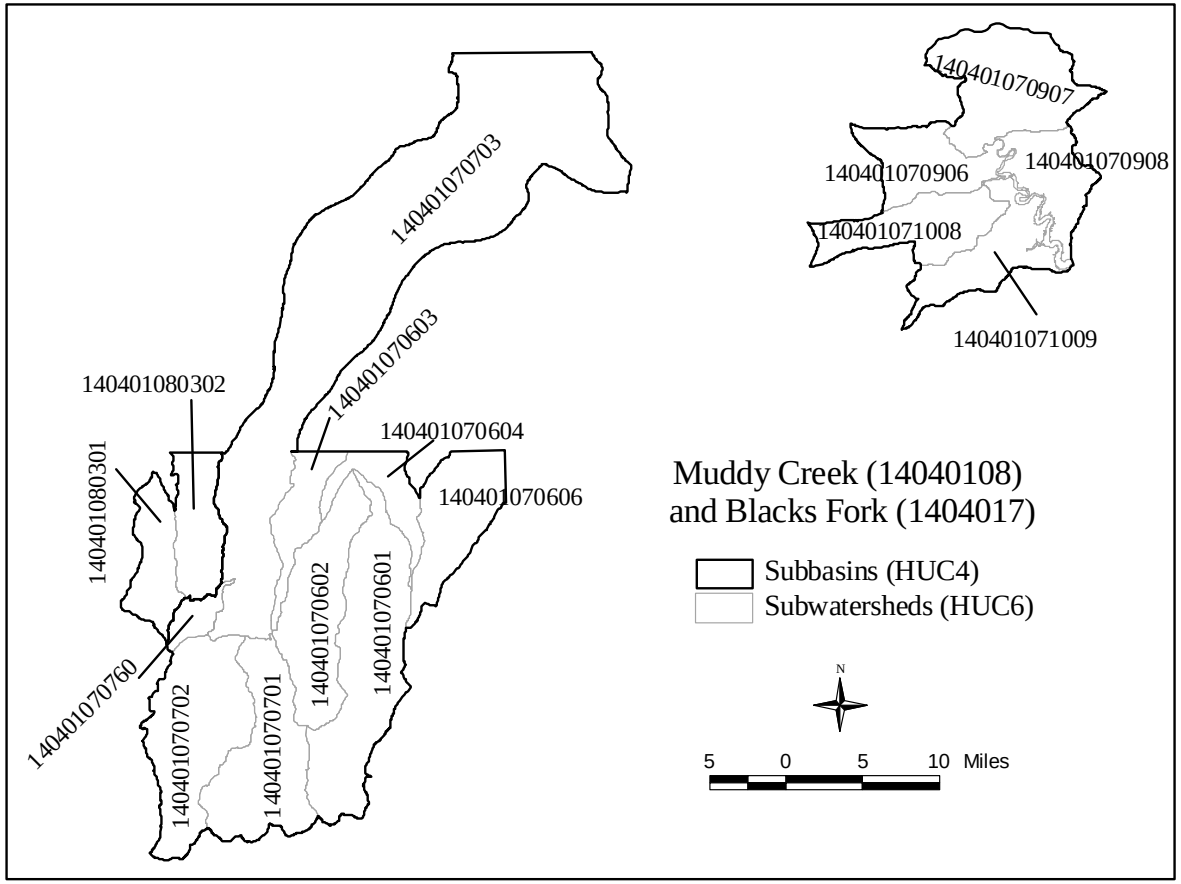


Figure B-3- 22. Map of the Blacks Fork (4th HUC - 14040107) and Muddy Creek (4th HUC – 14040108) drainages with 6th level HUCs on the Wasatch-Cache and Ashley National forests.

(Table B-3-8). Risks and threats associated with the Muddy Creek Drainage (HUC-14040108) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
W.F. Muddy Cr. 140401080301	3,2,2	2	1	2	4, 1 mile of stream on Forest	4	0.088594	0.000000	0/0 bad data	None	Flat
140401080302	2,2,2	5 no water on Forest	5 no water on Forest	5 no water on Forest	5 no water on Forest	5 no water on Forest	0.000000	0.000000	5 no water on Forest	none	5 no water on Forest

Table B-3-9. Risks and threats associated with the Duchesne River Drainage (HUC-14060003) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Middle North Fork on w-c 140600030102	3,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.330787	1.193287	34/0	Rainbow, Brook trout	5 cutthroat not present
Lower North Fork on w-c 140600030103	3,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.321923	0.410352	0/0	Rainbow, Brook trout	No habitat on Forest

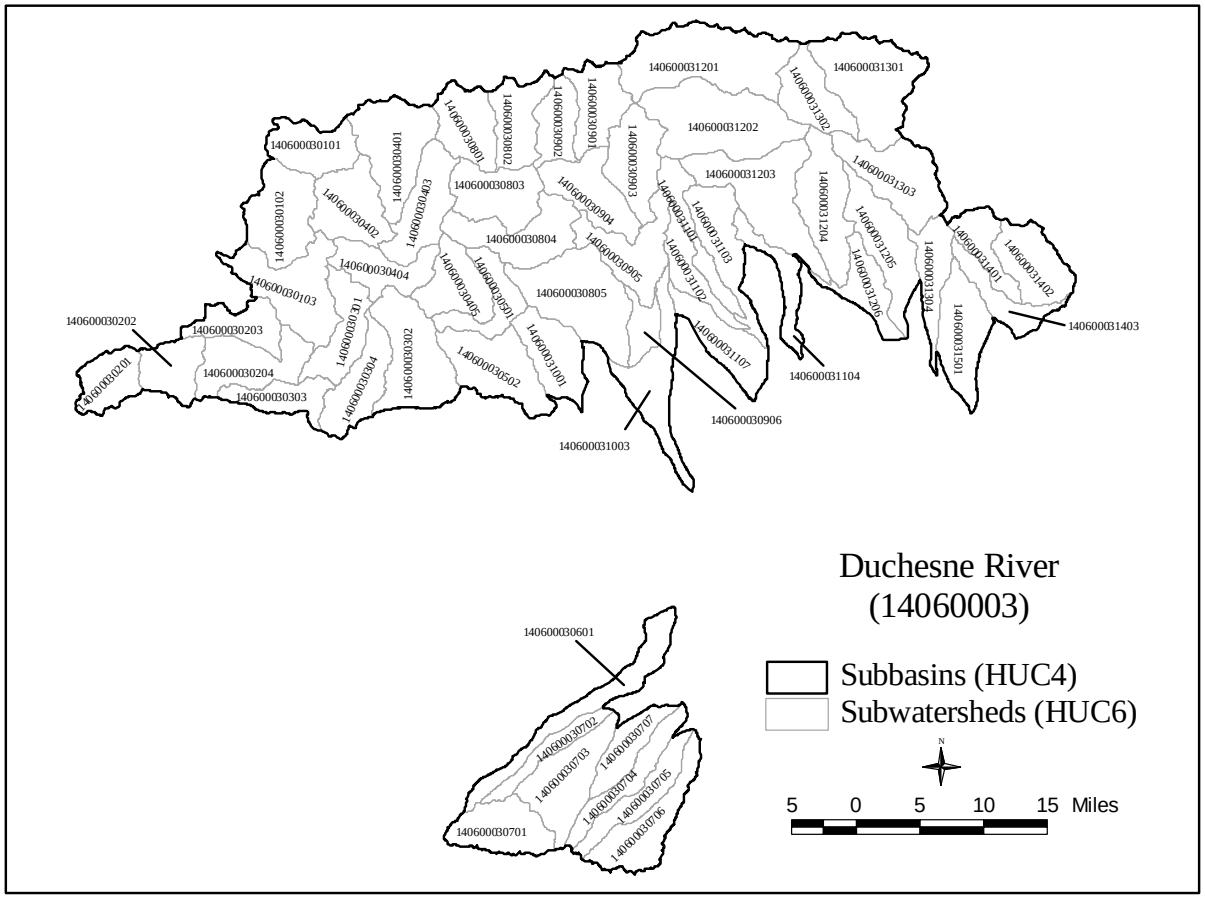


Figure B-3- 23. Map of the Duchesne River Drainage (4th HUC - 14060003) with 6th level HUCs on the Wasatch-Cache, Uinta and Ashley National forests.

Table B-3-10. Risks and threats associated with the Upper Bear River Drainage (HUC-14040107) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
East Fork Bear River 160101010101	2,2,1	2 Some disturbance in drainage	2 limited metapopulation, non-natives	1 limited influence	2 good connectivity	3	0.432246	0.014046	285/751	Rainbow brook	Flat
Stillwater Drainage 160101010102	2,2,1	1 Mostly in wilderness	1 large metapopulation 322 fish/mile, 4 miles of stream	1 habitat excellent	1 good connectivity	1	0.426281	1.147866	0/1080	Rainbow	Flat
Hayden Fork 160101010103	3,2,1	2 less stable conditions	1 large metapopulation	3 tie hacking impacts	2 fewer main river individuals	3 population is Hayden Fork is limited	0.431153	1.832368	0/678	Rainbow Brook	Down
West Fork Bear River, Meadow, Humpy, Deer C 160101010104	3,2,3	2 Dam natural hydrograph disrupted	1 large population 1562 fish/mile)	2 dam and flow alteration	2 some restriction in access between populations	2	0.590703	0.000000	0/6095	Rainbow brook	Flat
Lower Part near Guard Station 160101010105	2,2,2	1 relatively stable	3 potentially connected to metapopulations seasonally	3 water temperature, diversions, road impacts	1 good connectivity	3	1.905344	9.799349	0/295	Rainbow	Down
Lower Part of Bear River 160101010106	Non-Forest	0 private lands	0 private land	0 private lands	0 private lands	0 private lands	0.000000	0.000000	0/0	Rainbow brook	0 private lands
Mill Creek Drainage 160101010201	3,2,2	1 good stability	2 low population number 85-50 fish/mile	3 tie hacking and road impacts	1 good connectivity	2	0.826135	0.439950	9/1740	None	Flat

Table B-3-10. conti.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Upper Woodruff Creek 160101010501	3,2,3	1 good stability	1 large metapopulation	1 good condition	1 good connectivity	1	0.496641	0.000000	252/2300	None	Flat
Sugar Pine Creek 160101010502	3,2,3	1 good stability	1 large metapopulation	2 grazing impacts	1 good connectivity	2	0.171206	0.003036	1428/0	None	Up riparian fencing
Birch Creek 160101010503	2,2,3	0 private lands	0 private land	0 private lands	0 private lands	0 private lands	0.232451	0.000000	0/484	None	0 private lands
Lower Woodruff Creek 160101010504	Non-Forest	0 private lands	0 private land	0 private lands	0 private lands	0 private lands	0 private lands	0 private lands	0 private lands	None	0 private lands
Upper Big Creek 160101010601	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.430222	0.000000	0/422	None	5 cutthroat not present
Dry Canyon 160101010602	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.844647	0.000000	0/0	None	5 cutthroat not present
Old/Pole/Spring Canyon 160101010603	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.545517	0.000000	0/40	None	5 cutthroat not present
Otter Creek 160101010604	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.969241	0.000000	0/46	None	5 cutthroat not present

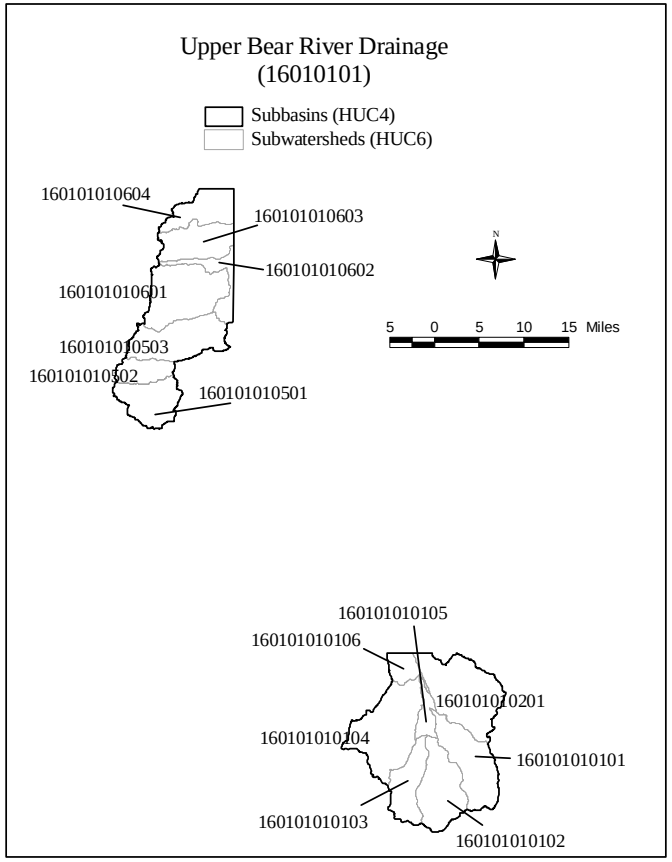


Figure B-3- 24. Map of the Upper Bear River Drainage (4th HUC - 16010101) with 6th level HUCs on the Wasatch-Cache National Forests.

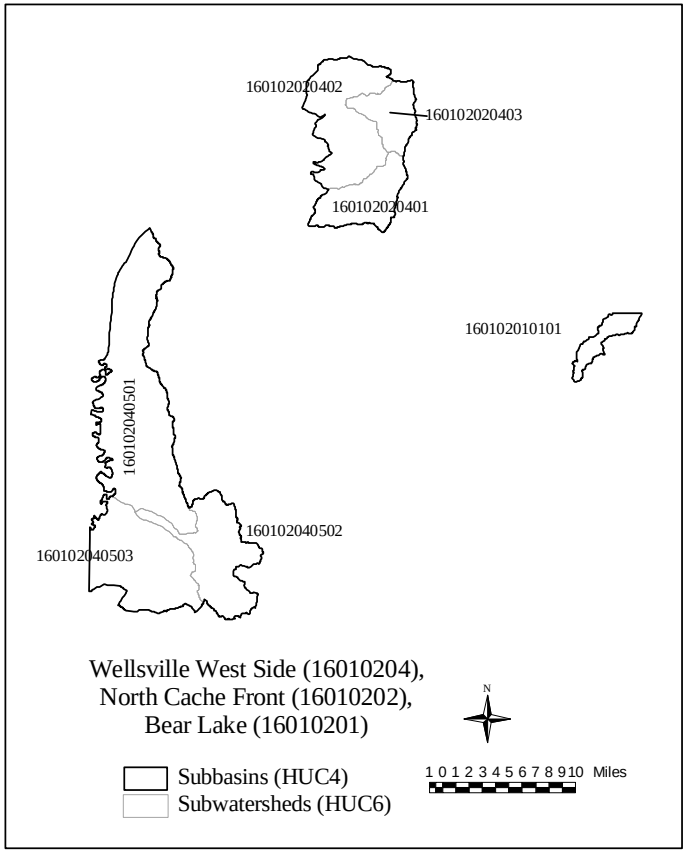


Figure B-3- 25. Map of the North Cache Valley, the western Wellsville and the Bear Lake 4th and 6th level HUCs on the Wasatch-Cache National Forests.

Table B-3-10. Risks and threats associated with the North Cache Valley (HUC-16010202) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Cache N. Front 160102020401	2,2,2	2 nonnative species, some physical disturbance	3 small isolated population	2 road up bottom, water diversion	4 very isolated	4	0.353667	0.315409	30/0		Flat
Cache N. Front 2160102020402	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.139644	0.000000	20/0		Flat
High Creek 160102020403	2,1,2	1 good stability	3 small isolated population	2 Road and trails causing concerns	4 very isolated	4 isolation, crossbreeding	0.304283	0.190738	377/0	Brown rainbow	Down

Table B-3-11. Risks and threats associated with the West Wellsville Mountains (HUC-16010203) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
West side of Wellsville Mountains 160102040501	1,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.064383	0.000000	0/0	No fish	5 cutthroat not present
Box Elder Creek 160102040502	3,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	1.299956	4.689932	10/0	brown	5 cutthroat not present
Perry area 160102040503	2,1,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.068590	0.000000	0/0	No fish	5 cutthroat not present

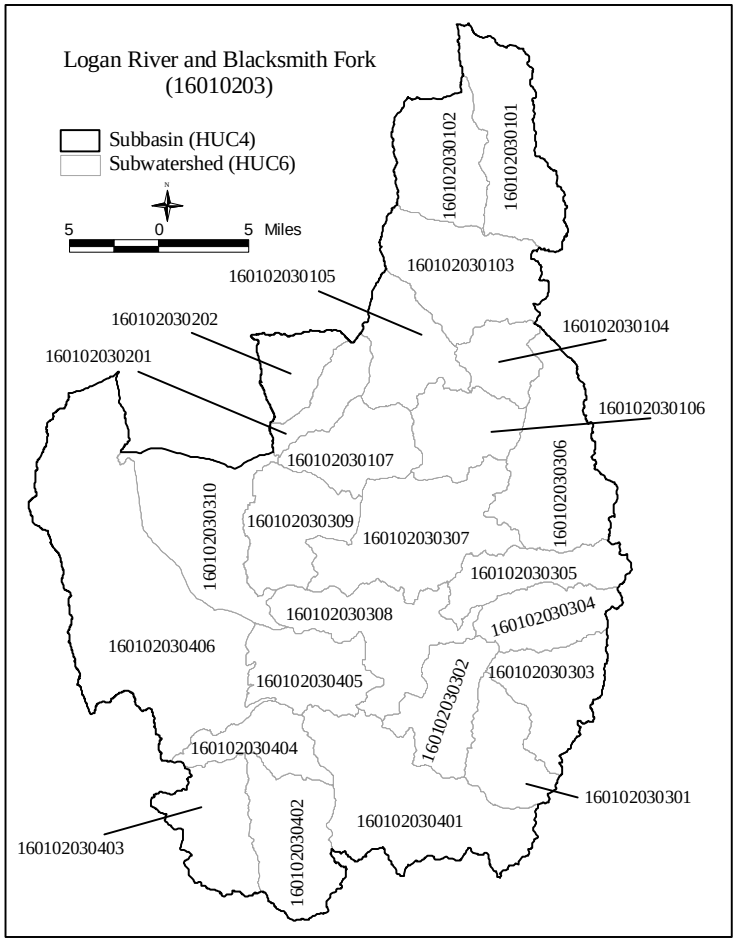


Figure B-3- 26. Map of the South Cache Valley and West Wellsville Mountain 4th and 6th level HUCs on the Wasatch-Cache National Forest.

Table B-3-12. Risks and threats associated with the South Cache Valley (HUC-16010203) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Beaver Creek 160102030101	2,2,2	1 good stability	1 large metapopulation	2 Road and trails causing concerns	1 good connectivity	1	0.520308	0.000000	343/3393	Brook trout	Flat
Franklin Basin 160102030102	2,2,2	1 good stability	1 large metapopulation	1 good condition	1 good connectivity	1	0.335658	0.000000	0/0	None	Flat
Tony Grove area 160102030103	2,2,2	1 good stability	1 large metapopulation	1 good condition	1 good connectivity	1	0.576588	1.202126	2567/3896	None	Flat
Temple Fork 160102030104	2,2,2	1 good stability	1 large metapopulation	1 good condition	1 good connectivity	1	0.446727	0.017268	1726/1909	Brook brown	Up
Cottonwood Canyon 160102030105	2,2,2	1 good stability	1 large metapopulation	2 Road causing concerns	1 good connectivity	2 limited water	0.380745	0.343881	494/3194	Brown	Flat
Right Hand Fork 160102030106	3,2,2	1 good stability	1 large metapopulation	2 Road causing concerns	1 good connectivity	2 limited resident population	0.572908	0.399213	996/8814	Brown	flat
Lower Logan Canyon 160102030107	2,2,2	2 power and water diversions	1 large metapopulation	2 Road and trails causing concerns	2 dams limit migration	2 Migration barriers	0.699064	4.410107	0/385	Rainbow brown	Flat
Green Canyon 160102030201	3,2,2	5 No fish	5 No fish	5 No fish	5 No fish	5 No fish	0.413891	0.691854	0/1102	No fish	No fish
Hyde Park 160102030202	2,2,2	5 No fish	5 No fish	5 No fish	5 No fish	5 No fish	0.105781	0.000000	11/0	No fish	No fish
Sheep Creek 160102030301	2,2,2	2 some physical disturbance	2 moderate population	1 good condition	1 good connectivity	2 Very limited water on Forest	0.100261	0.000000	0/1359	Unknown	Flat

Table B-3-12. continued.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Mill Creek 160102030302	Non-Forest	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.703329	0.000000	Non W-C Forest Lands	Non W-C Forest Lands	Non W-C Forest Lands
Upper Blacksmith Fork 160102030303	2,2,2	2 some physical disturbance	2 moderate population	1 good condition	1 good connectivity	2	0.406382	0.000000	0/4717	Unknown	
Curtis Creek 160102030304	2,2,2	1 good stability	2 moderate population	2 grazing impacts	2 some restriction in access between populations	2 limited distribution	0.172322	0.000000	0/1064	Rainbow	Flat
Rock Creek 160102030305	Non-Forest	1 good stability	2 moderate population	2 grazing impacts	2 some restriction in access between populations	2 limited distribution	0.391799	0.000000	233/2435	None	Flat
Saddle Creek 160102030306	3,2,2	2 channel moderately variable	4 small isolated population	3 system altered upstream	4 very isolated	4 very isolated, water quality	0.701763	0.000000	4930/3668	None	Down
Left Hand Fork Blacksmith Fork 160102030307	3,2,2	2 high impacts form a road and large drainage area above a narrow canyon	2 limited migration between populations	3 major road up the bottom and campground	2 some restriction in access between populations	3 limited population	0.599150	0.081217	1803/5265	Brook brown	Down

Table B-3-12. continued.

Middle Part of Blacksmith Fork 160102030308	2,2,2	2 channel moderately variable	3 limited population	3 a dam and road and recreation impacts	2 some restriction in access between populations	3 limited population	0.342149	1.186801	46/0	Brown	Flat
South Logan Area 160102030309	3,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.471315	0.000000	726/36	Brown trout	Cutthroat not present
Lower Part of Blacksmith Fork 160102030310	Non Forest	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.000000	0.000000	0/0	Brown rainbow trout	0 Non W-C Forest Lands
Upper East Fork Little Bear 160102030401	2,2,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.339207	0.000000	0/3133	Brown	0 Non W-C Forest Lands
Davenport Cr. 160102030402	2,2,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0	0	0/0	None	0 Non W-C Forest Lands
Upper Little Bear River 160102030403	3,2,2	2 low habitat diversity	2 moderate population	2 roading and diversions	3 limited distribution		0.684120	0.000000	246/0	Unknown	Flat
East side of the Wellsville Mountains 160102030406	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.207081	0.013714	259/0	No fish	5 cutthroat not present

Table B-3-12. Risks and threats associated with the West Wellsville Mountains (HUC-16010203) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
West side of Wellsville Mountains 160102040501	1,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.064383	0.000000	0/0	No fish	5 cutthroat not present
Box Elder Creek 160102040502	3,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	1.299956	4.689932	10/0	Brown trout	5 cutthroat not present
Perry area 160102040503	2,1,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.068590	0.000000	0/0	No fish	5 cutthroat not present

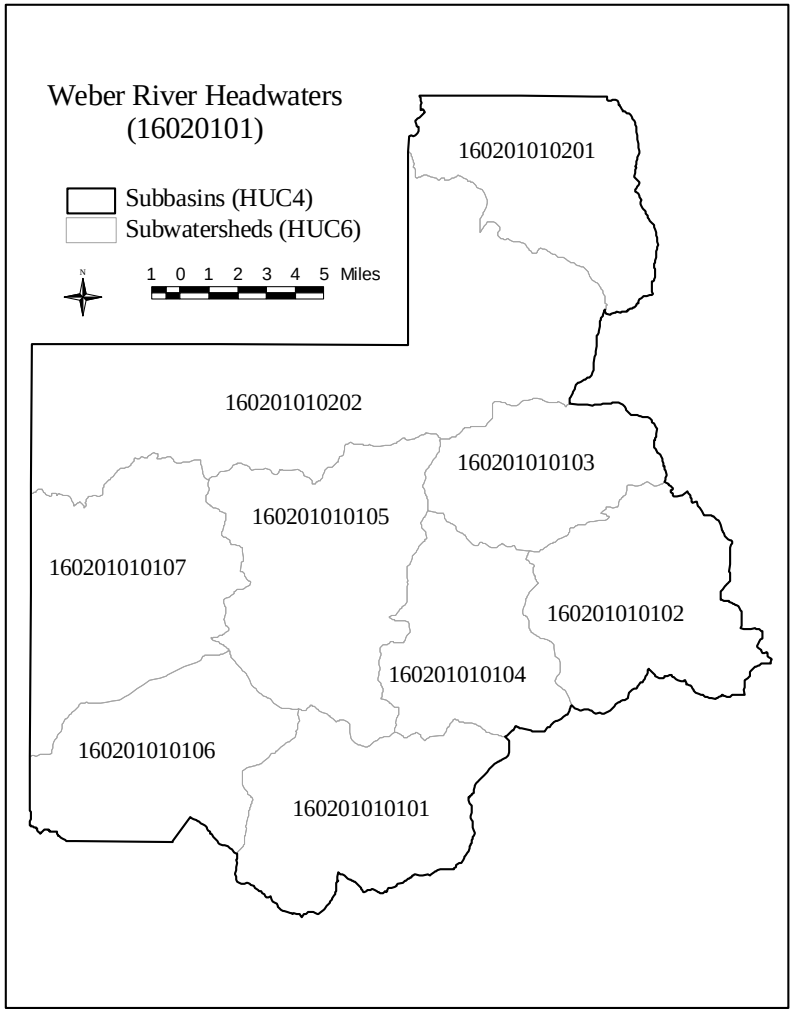


Figure B-3- 27. Map of the Weber River Headwaters 4th and 6th level HUCs on the Wasatch-Cache National Forest.

Table B-3-13. Risks and threats associated with the Weber River Headwaters (HUC-16020101) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Beaver Creek 160201010101	2,2,2	1 good stability	2 brook trout and stocked rainbow	1 good condition	1 good connectivity	1 good overall	0.566531	1.453240	1271/0	rainbow	Flat
Weber Headwaters 160201010102	2,2,2	1 good stability	2 limited numbers 153 fish/mile	1 good condition	2 some restriction in access between populations	2	0.347654	0.037295	0/544	Brook	Flat
Upper-Middle Weber 160201010103	2,2,2	5 No water on Forest	5 No water on Forest	5 No water on Forest	5 No water on Forest	5 No water on Forest	0.236504	0.000000	0/3738	No fish	5 No water on Forest
Smith Morehouse 160201010104	2,2,2	1 good stability	2 limited	2 limited juvenile habitat	2 some connection with other tribs.	2	0.369794	1.409371	107/937	Brook rainbow	Flat
South Fork Weber River (Nobletts Creek) 160201010105	3,2,2	1 good stability	3 interbreeding with rainbow, brook trout present	2 road impacts, habitat impacts	2 some restrictions caused by non-native fish	3 cross breeding concerns	0.254413	0.083949	521/0	Rainbow brook	down
Lower Beaver Creek 160201010106	3,2,2	5 no water on Forest	5 no water on Forest	5 no water on Forest	5 no water on Forest	5 no water on Forest	0.347213	0.000000	14/0	none	5 no water on Forest

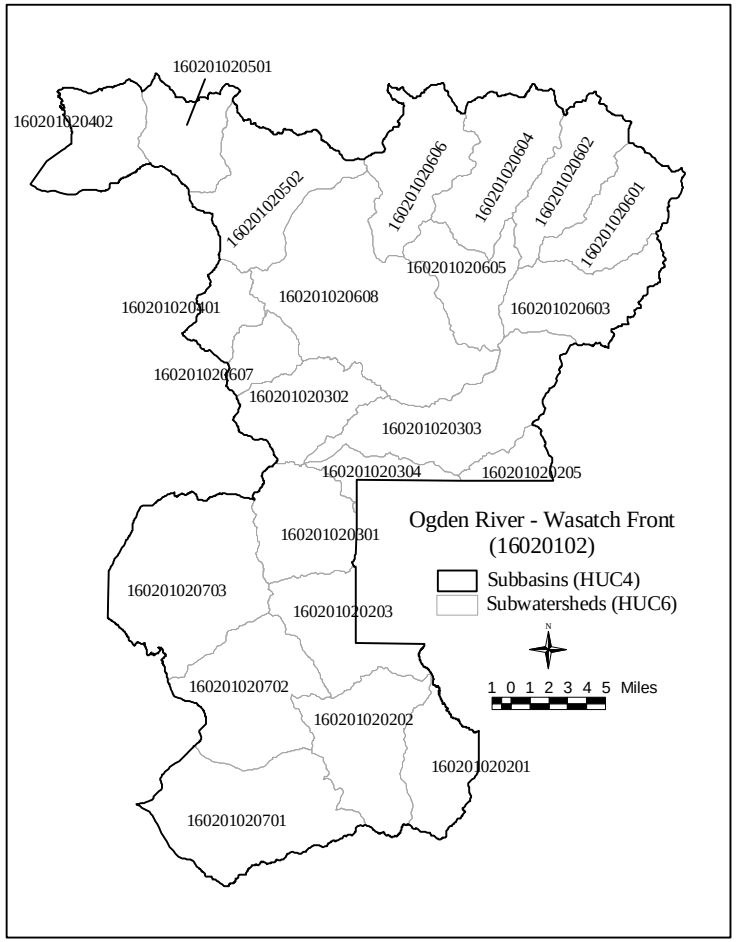


Figure B-3- 26. Map of the Ogden River and Wasatch Front's 4th and 6th level HUCs on the Wasatch-Cache National Forest.

Table B-3-14. Risks and threats associated with the Ogden River – Wasatch Front (HUC-16020102) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Woods Creek 160201020201	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	0.000000	0.000000	Non-Forest	Non-Forest	Non-Forest
Hardscrable Area 160201020202	1,2,2	1 good stability	1 1331/mile	2 moderate condition	2 Connected with Hardscrabble	2 limited waters on Forest	0.196652	0.000000	0/1239	none	flat
Deep Ck. 160201020203	2,2,2	1 good stability	2 unknown	2 moderate condition	3 more limited	3 isolation	0.143842	0.000000	0/103	Unknown	flat
N.E. Morgan 160201020205	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	0.000000	0.000000	0/0	Non-Forest	Non-Forest
Peterson area 160201020301	2,2,2	5 little water on Forest	5 little water on Forest	5 little water on Forest	5 little water on Forest	5 little water on Forest	0.066109	0.000000	0/274	little water on Forest	little water on Forest
Strawberry 160201020302	2,1,1	5 little water on Forest	5 little water on Forest	5 little water on Forest	5 little water on Forest	5 little water on Forest	0.064996	0.000000	0/0	little water on Forest	little water on Forest
Cottonwood Ck. 160201020303	2,2,2	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	0.270148	0.000000	0/0	Non-Forest	Non-Forest
Enterprise East 160201020304	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	Non-Forest	0.000000	0.000000	0/0	Non-Forest	Non-Forest
Ogden Canyon 160201020401	2,1,1	3 highly regulated from Pineview dam	3 Limited number of adult cutthroat trout	2 canalized stream through private residences and the road	4 very isolated	4 limited, isolated population	0.073004	0.007010	0/0	brown	flat

Table B-3-14. continued.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Willard Creek 160201020402	2,1,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.028069	0.391183	0/0	cutthroat not present	cutthroat not present
Upper Part of North Fork Ogden River 160201020501	2,2,2	2 roading and irrigation diversions	1 good populations	2 some canalizations	2 some what isolated	2 overall	0.045420	0.000000	44/0	none	Flat
North Ogden 160201020502	2,2,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.343040	0.000000	81/0	Non W-C Forest Lands	Non W-C Forest Lands
Left Fork South Fork Ogden River 160201020601	1,1,1	1 good stability	1 good numbers 567 fish/mile, 7 miles of stream	1 good condition	2 some water falls in area	2 good overall some crossbreeding	0.045449	0.000000	0/71	Rainbow	Down crossbreeding
Wheat Grass Creek 160201020602	3,2,2	1 Overall good stability	2 A mix of native & nonnative fish	2 some sedimentation and grazing and trail impacts	1 good connectivity	2 some habitat concerns	0.488347	0.009386	0/4373	None	flat
Right Fork South Fork Ogden River 160201020603	1,1,1	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 little water on Forest	0.031915	0.000000	16/0	Rainbow	little water on Forest
Beaver Creek 160201020604	2,2,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non -C Forest Lands	0 Non W-C Forest Lands	0 Non -C Forest Lands	0.320175	0.000000	0/0	Non W-C Forest Lands	Non W-C Forest Lands
Middle South Fork Ogden River 160201020605	2,2,2	2 Causey Reservoir influenced	2 limited numbers	2 non-native species	2 somewhat limited	3 very limited with many risks	0.855498	7.461755	0/0	Brown rainbow	Down non native fish, high developed us

Table B-3-14. continued.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Middle Fork Ogden River 160201020606	2,2,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands less than ½ mile on Forest	0.076456	0.000000	0/0	Non W-C Forest Lands	Non W-C Forest Lands
Wheeler Creek 160201020607	2,2,3	2 relatively stable	2 limited population	2 some in channel impacts	4 three miles of stream	3 limited population	0.610209	16.679276	0/0	Brook	flat
Pineview Reservoir area 160201020608	2,2,1	2 Pineview Dam regulated	2 limited population	2 non-native species	2 some diversions	3 very limited with many risks	0.335841	2.747821	0/0	Many	down
Bountiful area 160201020701	2,1,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.284618	0.727147	5 cutthroat not present	Cutthroat not present	Cutthroat not present
Farmington Centerville area 160201020702	2,1,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.361340	1.081580	5 cutthroat not present	Cutthroat not present	Cutthroat not present
Kaysville area 160201020703	2,1,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.115174	0.161373	5 cutthroat not present	Cutthroat not present	Cutthroat not present

Table B-3-15. Risks and threats associated with the Upper Provo River (HUC-16020203) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Upper Provo River 160202030101	3,3,2	3 heavily regulated dams	2 moderate populations very dispersed between lakes	3 a lot of non-native fish stocked	4 extremely isolated by dams and flow and non-native fish	4 isolation small populations	0.865851	1.939378	817/0	Rainbow brook	Down
North Fork Provo River 160202030102	2,2,2	2 impacted by high lakes dams	3 very limited numbers of fish 16 fish/mile	2 impacted historic dam runoff	2 some instream particular barriers	3 small populations	0.454641	0.000000	200/0	Rainbow brook	flat

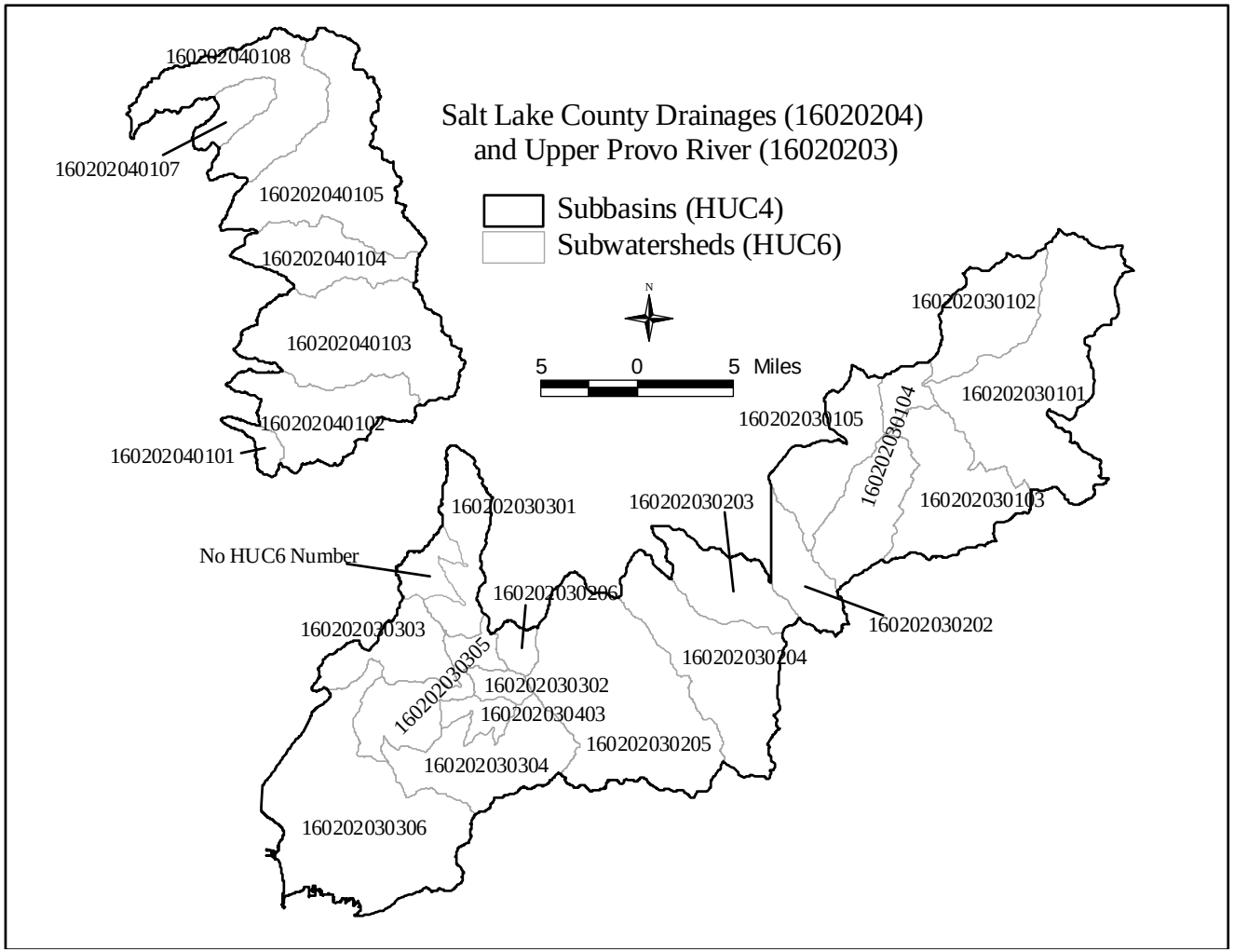


Figure B-3- 29. Forth and sixth level HUCs of the Jordan River and Provo River drainages on the Wasatch-Cache and Uinta National forests, Utah.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Draper Area 160202040101	2,1,1	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.408762	0.000000	0/0	No fish	5 cutthroat not present
Little Cottonwood Canyon 160202040102 1 mile of cutthroat trout	2,3,2	4 impacted by mine drainage, chemical problems	4 very limited population	3 water chemistry problems	3 very isolated	4	0.572512	27.298643	0/0	Brook rainbow	down
Big Cottonwood Ck 160202040103	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.728849	9.180067	0/0	Brook brown rainbow	5 cutthroat not present
Mill Creek 160202040104	3,3,3	1 natural hydrograph	2 limited native population	2 Road and trails causing concerns	3 very isolated	3 cutthroat present, CXR	0.753913	5.958687	0/0	Brown rainbow	down
Parleys Canyon 160202040105	2,1,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.243888	0.000000	0/0	Treated 1996	Up
Red Butte Canyon 160202040107	2,2,3	2 some natural flood impacts	2 good population	2 some natural fine sediments	2 entire drainage in use	2 in RNA doing well, habitat protected	0.553078	0.000000	0/0	Treated 1986	up
City Creek Canyon 160202040108	2,1,2	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0 Non W-C Forest Lands	0.140571	0.000000	0/0	Brown rainbow	Non-Forest

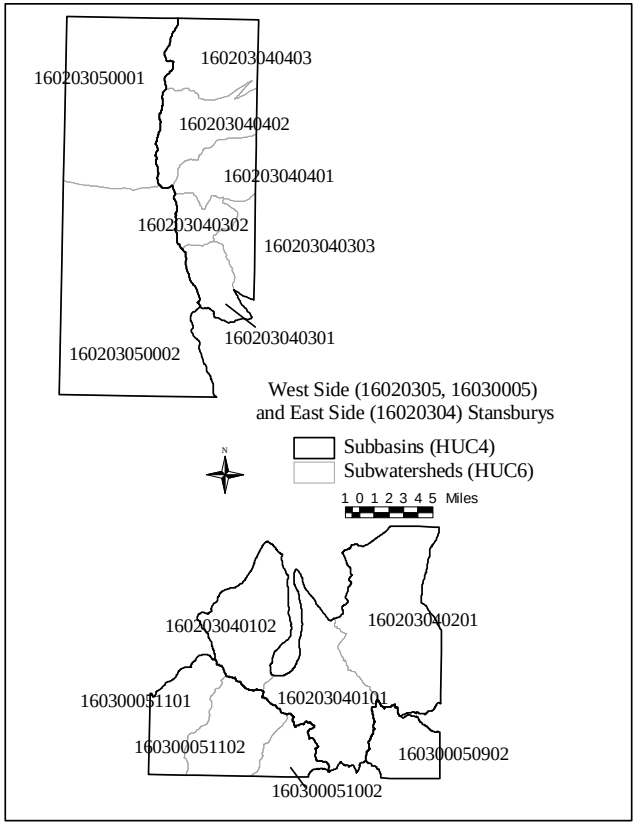


Figure B-3- 30. Forth and sixth level HUCs of the Stansbury Mountains on the Wasatch-Cache and Uinta National forests, Utah.

Table B-3-16. Risks and threats associated with the East Stansburys (HUC-16020304) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
East Stansburrys 160203040401	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.220481	0.000000	140/0	No fish	5 cutthroat not present
East Hickman Canyon 160203040402		5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.627181	1.526135	327/0	Rainbow brown	5 cutthroat not present
Magpie Canyon area 160203040403		5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.361260	0.073273	510/0	No fish	5 cutthroat not present

Table B-3-17. Risks and threats associated with the West Stansburys (HUC-16020305) on the Wasatch-Cache National Forest with the identified trend.

Subwatershed and 6th Field HUC Number	Landscape Condition GI,WQ,WV	Temporal Variability	Population Size	Growth and Survival	Isolation	Overall Extinction Risk	Roads, Trails, Motorized Trails (%)	Developed & Special Use (%)	Grazing Head-months (cow/sheep)	Non-native fish	Trend
Northwest Stansbury Mountains 160203050001	2,2,2	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.151549	0.000000	433/0		5 cutthroat not present
Southwest Side of Stansbury Mountains 160203050002	2,2,3	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	5 cutthroat not present	0.220316	0.000000	0/0	Rainbow	5 cutthroat not present

Conclusions regarding viability of populations and metapopulations on the WCNF under current management:

The Bonneville and Colorado River cutthroat trout are believed to be able to persist on the WCNF under current risks and threats (Alternative 4), although losses of some populations and declines in some metapopulations are expected. The small, isolated populations appear to be at the greatest risk of extirpation either through physically losing the population, or loss through introgressions (i.e. crossbreeding with rainbow trout). Some of these populations will probably be lost through the actions or lack thereof of man in conjunction with natural events. Other may be lost as a result of natural consequences from past actions and/or natural events. There are seven populations of cutthroat trout that we expect to lose over the next 15 years (Table B-3-18). A number of other populations could be lost due to natural or man caused uncharacteristic events such as high intensity fires, debris flow, or even chemical spills. This has occurred in the past with limited documentation.

At the subbasins (4th level hucs) level, the Wasatch-Cache National Forest are expected to continue to provide habitat for the Bonneville and Colorado River cutthroat trout and many other aquatic and semi-aquatic species. There were assumptions made about effects to viability through risks and threats described above because of the lack of all the data and basic understanding of life history stages. In addition tohaving a limited population data set, data is not available for these species' genetic variability, sex ratios, movements within and among populations, or meta-populations. As such, assessments were made based on potential threats relative to current risk and status of the populations.

Table B-3-18. Populations on the Wasatch-Cache National Forest that are believe to be headed for extirpation during the next 15 years, the suspected cause and current efforts to maintain the population.

6th Level HUC	Population Name	Suspected Cause	Potential Additional Action
160101010103	Hayden Fork	Limited population size. Non-native fish competition. Loss of complexity from historic tie hacking.	Treatment to remove non-native fish and habitat enhancement to restore complexity could decrease threats. Habitat survey work completed in 2001.
160102020403	High Creek	Interbreeding with non-native rainbow trout. No connectivity with other populations. Only hybridized cutthroat/rainbow trout have been found in the drainage.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage
160102030306	Saddle Creek	Lack of water, habitat impacts from roads, non-native fish and grazing upstream of the population. No connectivity with other	Site-specific analysis to identify exact location of the problems and potential corrective solutions need to be identified. North Rich Allotment Management Plan currently under revision.

		populations due to intermittent stream flows. Current year class failures.	
160201010105	South Fork Weber River	Limited population size. Non-native fish competition. Interbreeding with non-native rainbow trout.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage.
160202040102	Little Cottonwood Creek	Limited population size. Poor water chemistry (heavy metals). Upstream access to the stream and the potential for toxic spills are moderate.	Efforts to explore correction of the water chemistry problem are being made.
160202030101	Soapstone Creek	The stream has been dry by late June in 2001 and 2002, which would cause year class failures. Lack of habitat complexity. No connectivity with other populations. Limited population size.	Additional drainage wide surveys could be completed to verify if all native, pure cutthroat trout have been lost from this drainage.
160202030101	Rock Creek	Limited habitat and water. No connectivity with other populations (suspected biological barrier).	Additional drainage wide surveys could be completed to verify if a biological barrier exists for this population.

Table B-3-19. The 15 and 100 year expectations regarding the likelihood of the species to maintain viability at the 4th level HUC under current management.

Watershed Code	Watershed Name	15 Year Call	100 Year Call	Comments
14040106	Henrys Fork River	Viable	Viable	
14040107	Blacks Fork River	Viable	Viable	
14040108	Muddy Creek	Viable	Viable	Contingent on private land stewardship
14060003	Duchesne River	No cutthroat	No cutthroat	
16010101	Upper Bear River	Viable	Viable	Loss of a population
16010201	Bear Lake	Off Forest	Off Forest	No fish on Forest
16010202	North Cache Valley	Viable (declining)	Nonviable	Loss of a population
16010203	South Cache Valley	Viable	Viable	Some populations nonviable
16010204	West Wellsville Mountains	No cutthroat	No cutthroat	
16020101	Upper Weber River	Viable	Viable (declining)	Loss of a population

16020102	Ogden Front	Viable	Viable (declining)	
16020203	Provo River	Viable (declining)	Viable (declining)	Loss of populations
16020204	Jordan River	Viable (declining)	Viable (declining)	Loss of populations
16020304	Rush-Tooele Valleys	No cutthroat	No cutthroat	
16020305	Skull Valley area	No cutthroat	No cutthroat	

Step 5. Conservation approaches for species-at-risk to maintain existing populations.

There are a number of guiding documents, directives and processes currently in-place that will aid in the long-term conservation of aquatic ecosystems and pertinent to the Bonneville and Colorado River cutthroat trout on the Wasatch-Cache National Forest. The existing documents that guide the management of the general water quality conditions are found in the Desired Future Conditions, Goals, Subgoals, Standards and Guideline sections in this Forest Plan and EIS. The existing documents that provide direction for the long-term persistence of the cutthroat trout include:

1. "Fish Stocking and Transfer Procedures" of the Utah Division of Wildlife Resources (1997). This document set out the general policy and procedures for stocking and transplanting of fish in the State of Utah. In it's policy direction it states, "Fish stocking . . .will only be conducted in a manner that does not adversely affect the long-term viability of native aquatic species or their habitat, aids native species conservation, and enhances fish populations in existing aquatic habitats and aids the efficient and effective management of recreational fisheries to provide angling diversity and participation."

2. The Conservation agreement and strategy for Bonneville Cutthroat Trout in the State of Utah" (Utah Division of Wildlife Resource 1997). This conservation strategy identifies the major threats and actions to be taken to preserve this species. It is generally a fish management document with minimal emphasis on habitat protection and enhancement.

3. The "Conservation agreement and strategy for Colorado River Cutthroat Trout in the State of Utah" (Utah Division of Wildlife Resource 1997). This conservation strategy identifies the major threats and actions to be taken to preserve this species. It is generally a fish management document with minimal emphasis on habitat protection and enhancement.

4. The "Conservation agreement and strategy for Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah and Wyoming" (2001) provides a unified direction for the conservation of

Colorado River cutthroat trout.

5. The "Conservation agreement and strategy for Bonneville cutthroat trout (*Oncorhynchus clarki utah*) in the States of Idaho, Utah, Nevada and Wyoming " (2000) provides a unified direction for the conservation of Bonneville cutthroat trout.

6. The "Range-wide conservation agreement and strategy for Bonneville cutthroat trout (*Oncorhynchus clarki utah*)", (2001) provides a unified direction for the conservation of Bonneville cutthroat trout across its range.

7. The Final Environmental Impact Statement on Rangeland Health (WCNF 1996), as ammended with this EIS, provides recognition of the value of waters with native cutthroat trout. The waters containing native cutthroat are identified with class I riparian values.

8. The goals, standards and guides in this document also provide conservation measures along with the Forest Service Manual section 2600. As part of this direction, prior to approval of any ground disturing activity, a biological evaluation/assessment must be prepared. This document must then be signed by the botanist, terrestrial and aquatic ecologist identifing the consequences of those activities.

9. On the ground actions also continue to occur at site specific locations. Range exclosures, monitoring and habitat improvement projects continue to be implemented.

10. A major action that has taken place istherecognition of the value of the streams on the Wasatch-Cache National Forest to the long term preservation of the cutthroat trout in the states of Utah and Wyoming. In Alternative 7 this had been done by designating all areas inhabitated by cutthroat trout as perscription 3.1 riparian. This sets forth the objectivers for the area and the importance of the Wasatch-Cache National Forest in preserving these species.

The Forest Plan will provide additional direction and conservation measures for reducing risks and threats.

APPENDIX B - 4

Botanical Resource Diversity and Viability

Introduction

This Appendix provides information used to evaluate potential environmental consequences of alternatives in the FEIS as well as to assess the current situation with regard to plant Species At Risk (SAR), which includes Threatened, Endangered, Proposed, Sensitive, and Recommended Sensitive, and Watch List plant species. It includes a listing of these plant species along with their status, global and state ranking, global and management area distribution. It identifies potential threats to viability in three categories. This approach then aggregates Wasatch-Cache SAR plants by habitat groups and identifies potential threats to each group. Finally it includes a brief discussion of rare and unique communities, traditional and cultural species of interest to American Indians and special forest products.

Table B4-1. Federal and State Status, Endemism, Global distribution, and Management Area Distribution of the SAR Plants that occur on the Wasatch-Cache National Forest

Species	Common Name	Global[1]	State[2]	Endemism[3]	Global Distribution	Management Area Distribution[4]
Angelica wheeleri Wats.	Wheeler's angelica	G2	S2	Utah	Regional Endemic	CW, CHBE
Arabis glabra var *furcatipilis* (L.) Bernh. Hopkins	Hopkin's tower-mustard	G5T2?	S1	Northeastern Utah, western CA	Sparsely Distributed	CW, CHBE
Arabis lasiocarpa Rollins	Wasatch rock-cress, Toiyabe rock-cress	G3	S3	Wasatch Mountains	Local Endemic	CHBE, NWOV, CW
Artemisia norvegica var. *piceetorum* (*A.arctica* Less. ssp. *arctica*) Welsh & Goodrich	Spruce wormwood	G5T1Q	S1	UT, AK, CAL, CO.	Regional endemic	EUM, WUM
Aster sibericus var. *meritus* L. (*Eurybia sibirica* (L.) Nesom)	Siberian aster	G5T5	S1	UT, AK, Yukon, OR, ID, WY Eurasia	Disjunct	EUM
Astragalus flexuosus var. *flexuosus* (Hook.) Rydb.	Bent milkvetch	G5T5	S1	Western and Central US	Widespread	WUM
Astragalus jejunus var. *jejunus* Wats.	Starvling milkvetch	G3T3	S1	Western US?	Regional Endemic	BEAR
Astragalus robbinsii (Oakes) Gray	Robbins' milkvetch	G5	S1	AK to Newfoundland, So to OR, NV, CO, and Vermont	Regional Endemic	WUM
Botrychium crenulatum	Dainty moonwort, Crenualte moonwort	G3	S1	Western US	Disjunct	WUM
Botrychium lineare	Dainty	G1	S1	North America	Sparsely	CW

Species	Common Name	Global[1]	State[2]	Endemism[3]	Global Distribution	Management Area Distribution[4]
	moonwort				Distributed	
Cirsium eatonii var. *murdockii* Welsh	Murdock's thistle	G5T2T3	S2S3	CO, ID, NV, UT	Regional Endemic	EUM
Corydalis caseana ssp *brachycarpa* (Rydb.) Ownbey	Wasatch fitweed	G5T2	S2	Central Wasatch Mtns.	Regional Endemic	CW, NWOV
Cymopterus acaulis var. *parvus* Goodrich	Small spring parsley	G5T2T3,	S2S3	Western US	Regional Endemic	S
Cymopterus lapidosus (Jones) Jones	Echo spring-parsley	G3	S1	Western Summit Co. and southwest WY	Local endemic	EUM, WUM
Cypripedium calceolus var *parviflorum* L. (*Cypripedium parviflorum* – Salisb.)	Lady's slipper	G5	S1	Utah, British Columbia to Washington , New York and Louisiana, Eurasia	Widespread	CW
Cypripedium fasciculatum Kellogg ex Wats.	clustered lady's slipper, brownie lady's slipper	G4	S1	Ut, Id, Wy & CO west to WA, OR &CAL	Sparsely Distributed	CW, CHBE
Dodecatheon dentatum var. *utahense*	Utah shooting star, Wasatch shooting star	G4T1	S1	SLC Co., UT	Local Endemic	CW
Draba brachystylis	Wasatch draba	G1G2	S1	Wasatch Mtns. Charleston Mtns. NV	Regional Endemic	CW, EUM
Draba globosa (D. densifolia var. *apiculata)*	Rockcress draba	G3	S2	Western US	Sparsely Distributed	EUM, WUM
Draba maguirei sensu lato	Maguire's draba	G3	S3	Logan Canyon	Local Endemic	CHBE
Draba maguirei var. *burkei*	Burke's draba	G3T2	S2	Northeastern Utah	Local Endemic	CHBE, NWOV
Epipactis gigantea Dougl. ex. Hook	Giant Helleborine	G4	S2S3	Western US	Sparsely Distributed	CHBE
Erigeron arenarioides (D.C. Eaton) Gray	Wasatch daisy	G3?	S3?	Utah	Local Endemic	NWOV, CW
Erigeron cronquistii Maguire	Cronquist daisy	G2	S2	Cache County Utah	Local Endemic	CHBE
Erigeron garrettii A. Nels	Garrett's daisy	G2	S2	Central Wasatch Mtns	Local Endemic	CW
Eriogonum brevicaule var. *loganum* (A. Nels.) Welsh	Logan buckwheat	G2Q	S2	Logan Canyon	Local Endemic	CHBE, BEAR
Ivesia utahensis *Wats.*	Utah Ivesia	G2	S2	Utah	Local Endemic	CW, WUM
Jamesia americana var. *macrocalyx* (Small) Engler	Wasatch Jamesia, Wasatch cliffbush	G5T2	S2	Utah	Local Endemic	CW
Lepidium montanum var. *alpinum* Wats.	alpine pepper plant, Wasatch pepper-wort	G5?T1	S1	Wasatch and Oquirrh Mtns.	Local Endemic	CW
Lesquerella garrettii Payson	Garrett's bladderpod	G2	S2	Wasatch Mtns.	Local Endemic	CW
Lesquerella utahensis Rydb.	Utah bladderpod	G3	S3	UTAH?	Local Endemic	CW
Musineon lineare (Rydb.) Mathias	Rydberg's Musineon	G2	S2	Bear River Range	Regional Endemic	CHBE

Species	Common Name	Global[1]	State[2]	Endemism[3]	Global Distribution	Management Area Distribution[4]
Papaver radicatum ssp *kluanense* *(P. kluanense)*	Artic Poppy	G5T3 T4	S1	AK,CO, ID,MT,NM,UT,WY & Canada	Regional Endemic	EUM, WUM
Penstemon compactus (Keck) Crosswhite	Cache beardtongue	G2	S2	Logan Canyon	Local Endemic	CHBE
Penstemon platyphyllus *Rydb.*	Broad-leaf beardtongue,	G2G3	S2S3	Utah	Regional Endemic	NWOV, CW
Penstemon uintahensis	Uinta Beardtongue	G3	S3	Uinta Mountains	Regional Endemic	EUM, WUM
Potamogeton foliosus var. *fibrillosus* (Fern.) Haynes & Reveal	Fibrous-stipuled pond-weed	G5T2T4	S1	Western US	Regional Endemic	EUM
Potentilla cottamii *N. Holmgren*	Cottam's cinquefoil,	G1	S1	Northeastern Utah, Southern Idaho	Sparsely Distributed	S
Potentilla pensylvanica var. *paucijuga* (Rydb.) Welsh & Johnston	Alpine cinquefoil, few-leaflet cinquefoil	G1	S1	Utah	Regional Endemic	EUM, WUM
Primula maguirei L.O. Williams	Maguire's primrose	G1	S1	Logan Canyon	Local Endemic	CHBE
Spiranthes diluvialis Sheviak	Ute ladies'-tresses	G2	S1	Western US	Sparsely Distributed	PH – all
Thelesperma pubescens *Dorn*	Uinta greenthread	G1	S1	Utah	Local Endemic	EUM
Viola beckwithii T. & G.	Beckwith's violet	G4	S2	Western US	Peripheral	CW, NWOV, CHBE
Viola frank-smithii N. Holmgren	Frank Smith Violet	G2	S2	Logan Canyon	Local Endemic	CHBE

[1] **Global** = Global ranking as assigned by Natural Heritage Program and Utah Native Plant Society.
[2] **State** = Utah State ranking, Utah Conservation Data Center and Utah Native Plant Society Rare Species list 2000; * = Utah State ranking, Utah Natural Heritage Program, 2000.
[3] **Endemism** = Utah = Utah endemic, SLC Co. = Salt Lake County Endemic, Logan Can. = Logan Canyon Endemic, Wasatch = Central Wasatch Endemic.
[4] **Management Area Distribution**
EUM = Eastern Uinta Mountains,
WUM = Western Uinta Mountains,
BEAR = Bear,
CHBE – Cache- Box Elder,
NW-OV = North Wasatch – Ogden Valley,
CW = Central Wasatch, and
S = Stansbury

Threats

Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TES plants and plant species at risk or their habitat. To adequately address the current or potential threats to the viability of

each species, they were split into three categories: 1) impacts to plants, 2) alteration of ecological factors, and 3) habitat reduction. This categorization system is adapted from the Region 4 viability module (Region 4 Viability Module 1999). Within each category, primary threats have been identified. For each category, a finding of no information (we found no current information of viability or threats) or no known threats (the species is not threatened by anything within that threat category) is possible. The current threats documented for each species and their intensities are summarized in Appendix F, Tables F-3, F-4, and F-5. References documenting each finding are summarized in Appendix F, Table F-6.

Impacts to Plants

This category represents those activities, Forest Service or otherwise, that may have direct or indirect effects on SAR plants. The following activities may threaten SAR plants:

- **Livestock Grazing Activities**: Livestock grazing and associated activities pose various threats to TES plants and plant species at risk and their habitats. Direct impacts may include livestock trampling, herbivory, congregation, and soil disturbance and compaction. Indirect impacts are more variable and include: increased potential for the spread of noxious weeds, the introduction of exotic species, and changes in species composition and species density. Impacts of grazing can occur in a variety of habitats including grasslands, shrublands and woodland environments and often affect the habitat available for the TES plants and plant species at risk. Livestock often utilize and congregate in riparian areas and meadows, which can alter species composition, and change and reduce the habitat available to TES plants and plant species at risk. Additionally, these changes in vegetation and bank stability can affect hydrological cycles, further impacting plants that depend on stable hydrological conditions i.e. *Angelica wheeleri* Wats. As plant species have evolved with herbivory by native ungulates, some species could benefit from grazing at appropriate intensity levels.

- **Recreation:** Recreational activities pose some of the greatest threats to rare plant species on the Wasatch-Cache National Forest. Activities such as rock climbing, hiking, horseback riding, mountain biking, ORV use, and undeveloped camping can have direct and indirect impacts to TES plants and plant species at risk and their associated habitats. These types of activities particularly threaten many TES plants and plant species at risk. Road building and development of campgrounds and other facilities used by recreationists also contributes to the impacts faced by TES plants. Development of these facilities can make areas more accessible and concentrate use. Parking areas, particularly when undeveloped recreation areas are utilized, pose similar impacts to plants. In Appendix F, the recreation threat code is assigned when the specific type of recreational impact is unknown. Specific types of recreational activities and their impacts are described below.

  Rock Climbing – Rock climbing can directly impact the habitat of cliff and rock outcrop TES plants and plant species at risk. Small soil pockets can be dislodged by climbers, which can directly impact the plants and the possible seed bank stores. *Primula maguirei* and *Viola frank-smithii* habitats are ideal for rock climbing and plants have been threatened by such activities in the past. Lichens and moss species endemic to rock habitats can also be damaged when areas are frequently used. Plant cover, species richness, and species abundance have been shown to decrease in cliff and rock

communities as the intensity of rock climbing activities increase (Camp and Knight, 1999).

Off-Road Vehicles (ORV's) - Off-Road vehicle use can disturb soil, impacting both habitat and potential habitat. Direct and indirect impacts from ORV use can threaten existing populations of TES plants and plant species at risk. Overuse and ORV congregation can decimate riparian areas. Non-recreational use of ORV's (i.e. used in livestock management activities) also poses a threat to TES plants and plant species at risk and their habitat.

Hiking/Trampling*:* Hikers pose the greatest threat to TES plants and plant species at risk by not staying on the designated trails or paths, which results in trampled vegetation and soil compaction. Early spring and summer hiking, when there is still snow on the ground, can cause hikers to choose alternative hiking routes. This is especially detrimental when a population of a TES plant or plant species at risk is in a highly utilized recreation area, i.e. *Dodecatheon dentatum* var. *utahense* a proposed Sensitive species, is found in a picnic area. Trampling, hiking, and undeveloped recreation can be detrimental and sometimes lethal for these species. Associated undeveloped camping can also result in the destruction of and their surrounding habitat.

- **Wildlife:** Wildlife introduction programs, which include mountain goat introduction and non-native goat introductions, can pose severe impacts to rare species. Several of the current and proposed Sensitive species (i.e. *Aster kingii* var. *barnebyana* (Welsh & Goodrich) Welsh, *Lesquerella garrettii*, *Jamesia americana* var. *macrocalyx*) could be impacted by wildlife is such programs are employed within these habitats. Mountain goats were released on Willard Peak in 1994 in close proximity to a *Draba maguirei* var. *burkei* population (USDA Forest Service and US Fish and Wildlife Service, 2000). While the diets of mountain goats do not typically include this small Sensitive species, trampling and trailing impacts have been observed within the population. The herd size at present has more than doubled. As the mountain goat population continues to grow, the severity and extent of the impact is likely to increase.

- **Chemical Treatment:** Herbicides and pesticides used to manage for undesired species can directly and indirectly impact TES plants and plant species at risk. Herbicide drift from agricultural communities can pose major threats to many TES plants and plant species at risk. Additionally, chemical-spraying efforts for non-native species and exotic weed species can impact such species. Many of the TES plants and plant species at risk are dependent upon pollinators for sexual reproduction and seed set. The application of insecticides to reduce non-native pests can jeopardize important native pollinator populations, thus negatively impact the seed production and viability of TES plants and plant species at risk.

- **Timber Harvest***:* Logging and its associated activities can have many impacts to plant species. Vernally wet habitats are often used for log yarding and equipment storage. Road construction can directly impact existing populations of TES plants and plant species at risk. Additionally, mycorrhizal associations can be destroyed through ground disturbing actions such as trailing or skidding. Rare plant viability is ultimate affected by those activities

associated with logging that result in ground disturbance, soil compaction, microsite alteration, and increased erosion.

- **Collection:** Many vascular plants, lichens, and fungi are widely collected and harvested for personal and commercial use. Gathering of forest products for a variety of uses is an historical practice; however, new uses of plant species are constantly being discovered. Increased market and public demand for special forest products is rapidly surpassing the capabilities of the National Forests to monitor the impacts of such activities. Many TES plants and plant species at risk populations would be severally jeopardized if wide scale collection and harvesting were permitted. Rock garden species, i.e. *Primula maguirei, Draba maguirei* var. *burkei,* are extremely desirable and can be highly collected by amateur and professional gardeners (Welsh et al. 1993).

- **Fire Suppression:** Suppression of natural fire on the landscape can be helpful or harmful to native plant communities and to TES plants and plant species at risk and their habitats (Hesel and Spackman 1995). Fire may help maintain open habitat, encourage sexual and asexual reproduction, and reduce competition of aggressive plant species. Suppression efforts could prevent ecological processes necessary for TES plants and plant species at risk survival. The actual activities associated with fire suppression, such as cutting lines, concentration of personnel in areas, roads, etc., can also threaten plant populations. Only those species that required fire for growth, population expansion, or establishment were given a threat score in this category. Those species with known adverse effects to fire were included in the fire inclusion threat category below.

Appendix F, Table F-3 summarizes the impacts to plants and their associated magnitude (low, moderate, high) that are currently or potentially impacting these TES plants and plant species at risk.

Alteration of Ecological Factors

This category represents the activities, Forest Service or otherwise, that directly or indirectly affect the natural ecology and associated interactions of the TES current or proposed sensitive species and other species at risk. The following activities or conditions may impact the ecological factors associated with the TES plant species:

- **Fire exclusion:** Fire suppression efforts have altered the historical fire regime within National Forest Service lands. Many TES plants and plant species at risk require fire for expansion of their populations, for breaking seed dormancy, creation of habitat for seedling expansion, reduction of competition from aggressive or exotic species, and alteration of successional pathways (Hesel and Spackman, 1995). Wildfire prevention and suppression have affected stand structure, composition, and fire intensity. This in turn has altered the habitat conditions for SAR plants.

- **Fire inclusion:** Many species are adversely affected by fire inclusion either by directly killing plants or indirectly by encouraging the establishment and competition of exotic species (Hesel and Spackman, 1995). The overall impact to TES plants and plant species at risk and their habitats will depend upon the fire intensity, which is a function of season and

the climatic pattern occurring at the time of the fire. The potential for spring burning to meet prescribed fire goals can also threaten TES plants. Many plant species are not adapted to fires during seasons when they are phonologically active and may be at a greater risk of loss with off-season burning (Hesel and Spackman, 1995). Off-season burning may impact even those species that require fire for expansion and survival.

- **Genetic impurity and Genetic Uniformity:** Genetic uniformity can render populations more susceptible to epidemics of disease (Gaston, 1994). Disease outbreaks can cause heavy mortality in plants with little genetic diversity (Silvertown, 1985). Lack of genetic variation can also make such populations less likely to survive moderate to large-scale disturbances (Gaston, 1994). Small populations that remain relatively small for long periods of time are likely to be genetic less diverse than larger populations. Many of the TES plants and plant species at risk within the Wasatch-Cache National Forest have limited genetic variation and may be more susceptible to disease and disturbance as a result. Potential for hybrid speciation or genetic assimilation may be more extreme in spatially isolated or island populations (Arnold, 1997).

- **Alterations to the natural hydrologic regime:** Alterations to the natural hydrologic regime can range from small-scale activities such as livestock congregation to large-scale activities such as water diversions or dams. Many TES plants and plant species at risk, i.e. *Cypripedium calceolus* ssp. *parviflorum*, have specific moisture and microsite requirements that could be altered by management activities such as canopy reduction, forest fragmentation, livestock use of riparian areas, and stream diversions. Non-native species such *Tamarix parviflora* or *Lythum salicaria* can alter the hydrologic regime of native wetlands and meadows. Such alterations can also impact TES plants and plant species at risk native to these habitats.

- **Insects/disease:** Seed beetles, snails, rusts, and smuts can directly impact the fecundity and survival of plant species. There are identified pathogens or insects currently impacting the viability of several TES plants and plant species at risk. Insect herbivory of seeds, leaves, and stems can destroy individuals within the population. Additionally, disease outbreaks can cause heavy mortality in plants with little genetic variation (Silvertown, 1985).

- **Loss of pollinators**: Rare species are often dependent upon native pollinators for sexual reproduction and seed set (Tepedino et al., 1997). However, the current evidence is overwhelming that both native and domesticated pollinators are declining around the world. Many are already extinct and others are at risk from a variety of threats including: habitat reduction, pesticides, parasites, and disease. TES plant species cannot be assured viability unless both their habitat and that of their ecological interactors are assured. The identity of most of the pollinators, seed dispersers and other mutualists of TES plant species is unknown at present. Many native bees species have specialized pollen and nesting habitat requirements that must be met if their continued existence is to be insured.

- **Non-native species:** Competition from invasive non-native species and noxious weeds can result in the loss of habitat, pollinators, and decreased TES plants and plant species at risk viability. Roads, trails, and canopy reduction can provide ideal pathways for the introduction

of exotic and non-native species and livestock can serve as vectors of such invasive species. According to the Nature Conservancy, alien species are one of the leading threats to U.S. species and ecosystems. Indeed, exotics have contributed to the decline of 42 percent of U.S. threatened and endangered species.

- **Natural conditions:** Naturally occurring events, even in generally suitable environments, may cause the loss of populations. Rare species are often at greater risk of extinction than are common ones because small populations are more susceptible to stochastic events and disease (Gilpin and Soule, 1986). Some populations of TES plants and plant species at risk are intrinsically rare or relict species. Changes in ecological regimes due to management activities could potentially alter the life-history patterns and requirements for these isolated species.

- **Pollution:** Pollution of all types can be extremely detrimental to the existing populations of TES plants and plant species at risk. Native vegetation can be threatened by ground water pollution from decommissioned mines. Chemicals used in gold mining operations can be extremely detrimental to forested and non-forested habitats. Dust from the Highway 89 expansion and realignment project could pollute populations of TES plants and plant species at risk and impact pollination success (i.e. *Primula maguirei, Viola frank-smithii*).

- **Seed bank:** Seed bank depletion for TES plants and plant species at risk can occur due to reduced fecundity, insect herbivory, loss of genetic variation, and natural catastrophic events. Low reproductive output has been documented in many of the TES plants and plant species at risk. Factors contributing to this lowered fecundity are often not known. Many orchid species require mycorrhizal associations for germination of seeds. Ground disturbing activities can often destroy such critical interactions (Sipes and Tepedino, 1995). Inbreeding depression can cause a reduction in seed survival and viability. Those TES plants and plant species at risk with little genetic diversity may be more susceptible to reductions in seed set and seed survival.

- **Succession:** Ecosystems develop gradually and change in components, structures, processes, and their functions through succession. Successional processes have been altered due to fire suppression, timber harvesting, and other land management activities. Several species require a particular seral stage for survival. The alteration of successional pathways has reduced the habitat needed by several TES plants and plant species at risk. Open-gap species need small-scale disturbances and natural ecological process for establishment, while other species require conditions found in late-seral habitats. The alteration in successional pathways has pushed some ecosystems outside of the historic range of variability, with subsequent decreases in species diversity.

Appendix F, Table F-4 summarizes the alteration of ecological factors and the magnitude associated with such changes (low, moderate, high) that are currently or potentially impacting the habitat or potential of the TES plant species.

Habitat Reduction

The following activities may change the total availability or quality of actual or potential habitat:

- **Agricultural Conversion:** The conversion of native grasslands, shrublands, woodlands, and some forested regions for agricultural purposes has drastically reduced habitat for natural plant communities and TES plants and plant species at risk. The rich soils often associated with the grassland and shrubland communities have made these habitats extremely desirable for agricultural use.

- **Energy development:** Exploration activities for gas and oil resources and their removal from the landscape can directly and indirectly impact TES plants and plant species at risk and their habitats. Seismic activity is sometimes used to explore for such resources. The exploration for such resources occurs on the Evanston and Mountain View Ranger Districts.

- **Facilities:** Facilities are defined as any structure or area utilized for management activities or associated storage areas. These include campgrounds, livestock corrals, communication sites, backcountry airstrips, and other structures used for recreation or management. Vegetation trampling, soil compaction, and increased erosion are among the major impacts associated with facilities.

- **Military exercises:** Military exercises and activities can greatly reduce TES populations and associated habitats. Activities such as bombing ranges, tank ranges, and staging areas can directly impact populations. The amount of military activity within the Wasatch-Cache National Forest is extremely limited and the plant species at risk are not currently threatened by such exercises.

- **Mining:** Mining and its associated activities can directly and indirectly impact native plant species and their associated habitats. Roads associated with mining activities can also impact these species. Historically, mining was an important industry within the boundaries of the Wasatch-Cache National Forest. Mining currently is very limited within the Forest boundaries and poses little to no threats to the TES plants and plant species at risk.

- **Road Construction and Maintenance:** Both road construction and road maintenance activities can impact TES plants and plant species at risk and their habitats. Roads pose threats to such species by increasing access to habitat to ORV's, livestock, four-wheel drives, and other recreationists. Roads also provide ideal corridors for the invasion of non-native and exotic species. The placement of roads through rock outcrops or along ridges further destroys habitat of those species endemic to these regions (i.e. *Lesquerella utahensis, Draba maguirei* var. *burkei*).

- **Ski areas:** The Wasatch-Cache National Forest is home to some of the largest ski areas in the state of Utah. Snowbird, Solitude, Snowbasin, Brighton, and Alta are all within the forest boundary. Several species are directly impacted by the activities associated with ski areas including *Ivesia utahensis, Draba maguirei* var. *burkei*, and *Jamesia americana* var. *macrocalyx*. Threats from ski areas include direct trampling, mechanical construction, increased roads and facility development, increased summer recreation, and habitat fragmentation. Additionally, impacts from snowmaking and avalanche control could directly and indirectly effect populations of TES plants and plant species at risk. The production of

snow requires a large support of electrical lines, waterlines, compressor and pump buildings, and other support structures, which could directly impact TES plants and plant species at risk and their habitats (USDA Forest Service and US Fish and Wildlife Service Draft, 2000). Additional impacts to rare plant species could result from increased snow due to packing and grooming and avalanche control and could result in extended time needed for snow melt in the spring. Those species in the forested habitat and rock outcrop habitat groups could be impacted by expansion efforts of existing ski areas as well.

- **Transmission lines:** The installation of power lines, digital cable lines, phone lines and pipelines can impact essential habitat for a variety of TES plants and plant species at risk. They are usually associated with both mechanical construction and roads, as well as continued maintenance needs. The Kern pipeline, used for natural gas, is found on the Salt Lake Ranger District. Construction of communication sites and associated structures on the Wasatch-Cache National Forest have posed direct threats to TES species and their habitats in the past (i.e. *Draba maguirei* var. *burkei*). Demand for such sites in the future is likely to increase. Measures to prevent further impacts will be taken.

- **Trail construction:** Trails are often constructed on ridgelines and through rock outcrops, thus many times bisecting populations of TES plants and plant species at risk and disrupting the associated habitat. Additionally, seasonal run-off and precipitation can often cause extreme erosion in trail areas, thus increasing the impact of the trail construction. Trampling of vegetation as associated with trails and hiking is not included in this category. The effects of trampling are classified under the impacts to plants category.

- **Timber Harvest:** Timber harvest has many different effects to native plant populations and TES plants and plant species at risk and their habitat. These effects include: alteration of the canopy through removal or thinning, soil disturbance, destruction of mycorrhizal associations, associated disturbance caused by road construction, log yarding, and maintenance of large equipment. Of primary concern for rare plant viability are those activities associated with logging that result in ground disturbance, soil compaction, microsite alteration, and increased erosion.

- **Urban Development:** Development of lands for urban use is now a major cause of landscape-scale variation in ecosystems (Beatley 1994). Human impacts associated with urban development include: forest fragmentation, increased non-native species, decreased species richness, and soil compaction due to trampling. Urban development can also be responsible for alteration of the hydrologic regime through increased demands for water resources. Housing developments, facilities, and roads are encroaching on existing habitats for many of the TES plants and plant species at risk for the Wasatch-Cache National Forest.

Appendix F, Table F-5 summarizes the habitat reducing activities and their magnitude (low, moderate, high) that are currently or potentially impacting the habitat or potential of the TES plant species.

Aggregating the Wasatch-Cache TES Species and Species at risk by Habitat Groups

A diverse array of habitats, which vary in their distribution across the landscape and range widely in population density, support the current or proposed Sensitive species and other species at risk. These species are faced with a variable range of threats and differ in the degree to which Forest Service management has affected their status. The amount and quality of current scientific information available also varies greatly among species. This lack of information often limits the depth of interpretation of effects of alternatives on the long-term viability of such species. To examine this wide range of species and their associated threats, species were aggregated into habitat groups.

Habitat Groups

Plant species at risk (SAR) have been combined into habitat groupings or habitat associations. These groupings were Alpine, Subalpine, Mountain Forest, Riparian Meadows/Seeps, Woodland, Shrubland, High Elevation Grassland, and Rock Cliffs/Crevices and Talus /Scree.

Species	Common Name	Habitat							
		Mountain Forest	Riparian Meadows/ Seeps	Rock Cliffs/ Crevices Talus/Scree	High elev. Grassland	Shrubland	Woodland	Alpine	Subalpine/Non Forest
Abies concolor (Gord. &Glend.) Lindl.	White Fir	X							
Angelica wheeleri Wats.	Wheeler's angelica		X						
Arabis glabra. var *furcatipilis* (L.) Bernh Hopkins	Hopkin's tower-mustard		X				X		
Arabis lasiocarpa Rollins	Wasatch rock-cress, Toiyabe rock-cress	X				X	X		
Artemisia norvegica var. *piceetorum* Welsh & Goodrich	Spruce wormwood	X						X	
Aster sibericus var. *meritus* L.	Siberian aster			X				X	
Astragalus flexuosus var. *flexuosus* (Hook.) Rydb.	Bent milkvetch	X				X	X		
Astragalus jejunus var. *jejunus* Wats.	starvling milkvetch					X			
Astragalus robbinsii (Oakes) Gray	Robbins' milkvetch					X	X		
Botrychium crenulatum	Dainty moonwort, crenualte moonwort					X	X		
Botrychium lineare	Slender Moonwort		X						
Cirsium eatonii var. *murdockii* Welsh	Murdock's thistle			X					

Species	Common Name	Habitat							
		Mountain Forest	Riparian Meadows/ Seeps	Rock Cliffs/ Crevices Talus/Scree	High elev. Grassland	Shrubland	Woodland	Alpine	Subalpine/Non Forest
Corydalis caseana ssp *brachycarpa* (Rydb.) Ownbey	Wasatch fitweed	X	X				X	X	
Cymopterus acaulis var. *parvus* Goodrich	small spring parsley					X			
Cymopterus lapidosus (Jones) Jones	Echo spring-parsley					X			
Cypripedium calceolus ssp *parviflorum* L.	Lady's slipper		X						
Cypripedium fasciculatum Kellogg ex Wats.	clustered lady's slipper, brownie lady's slipper	X							
Dodecatheon dentatum var. *utahense*	Utah shooting star, Wasatch shooting star		X	X					
Draba brachystylis	Wasatch draba	X		X					
Draba globosa (D. densifolia var. *apiculata)*	Rockcress draba			X				X	
Draba maguirei sensu lato	Maguire's draba	X		X				X	X
Draba maguirei var. *burkei*	Burke's draba			X				X	X
Epipactis gigantea Dougl. ex. Hook	Giant Helleborine		X						
Erigeron arenarioides (D.C. Eaton) Gray	Wasatch daisy			X					
Erigeron cronquistii Maguire	Cronquist daisy			X					
Erigeron garrettii A. Nels	Garrett's daisy			X				X	X
Eriogonum brevicaule var. *loganum* (A. Nels.) Welsh	Logan buckwheat	X		X		X	X	X	X
Ivesia utahensis *Wats.*	Utah Ivesia			X				X	
Jamesia americana var. *macrocalyx* (Small) Engler	Wasatch Jamesia, Wasatch cliff-bush			X					
Lathyrus lanzwertii var. *lanszwerti*	Nevada Sweetpea						X		
Lepidium montanum var. *alpinum* Wats.	alpine pepper plant, Wasatch pepper-wort			X					
Lesquerella garrettii Payson	Garrett's bladderpod			X					X
Lesquerella utahensis Rydb.	Utah bladderpod			X		X		X	
Musineon lineare	Rydberg's Musineon			X					
Papaver radicatum ssp *kluanense*	Alpine Poppy			X				X	
Pedicularis parryi ssp. *Mogollonica*	Mogollon Lousewort	X				X	X	X	
Penstemon compactus (Keck) Crosswhite	Cache beardtongue			X					X
Penstemon platyphyllus Rydb.	Broad-leaf Beardtongue,			X		X			

Species	Common Name	Habitat							
		Mountain Forest	Riparian Meadows/ Seeps	Rock Cliffs/ Crevices Talus/Scree	High elev. Grassland	Shrubland	Woodland	Alpine	Subalpine/Non Forest
Penstemon uintahensis	Uinta Beardtongue			X				X	X
Porterella carnosula	Western Porterella		X						
Potamogeton foliosus var *fibrillosus* (Fern.) Haynes & Reveal	Fibrous-stipuled pond-weed		X						
Potentilla cottamii *N. Holmgren*	Cottam's cinquefoil,			X					
Potentilla pensylvanica var. *paucijuga* (Rydb.) Welsh & Johnston	Alpine cinquefoil, few-leaflet cinquefoil				X			X	
Primula maguirei L.O. Williams	Maguire's primrose			X			X		
**Spiranthes diluvialis* Sheviak	Ute ladies'-tresses		X						
Thelesperma pubescens Dorn	Uinta greenthread			X			X		
Viola beckwithii T. & G.	Beckwith's violet				X	X	X		
Viola frank-smithii N. Holmgren	Frank Smith Violet			X					

Table B4-2. Distribution of Threatened, Sensitive, Watch, and Species of Concern Plant Species by Habitat Groups

Habitat Group	Number of Species*
Alpine	14
Subalpine Forest/Non-forest	7
Montane Forest	10
Woodland	12
Shrubland	12
High Elevation Grassland	2
Riparian Meadows/Seeps	10
Rock Cliffs/Crevices and Talus/Scree	25

*Species may occur in more than one habitat group, thus the total numbers within habitat groups are cumulatively greater than the total of current or proposed sensitive species.

Threats, their intensity, and the references used to determine them are presented for each species in Appendix F, Tables F-3, F-4, and F-5. Documented threats to habitat groupings and the number of species potentially impacted are summarized below in tables for each habitat group. All potential threats are not addressed here; only those documented from the current literature, professional observation, and botanical expertise are included in the tables below.

Alpine (14 species)
Alpine habitats are defined as the area above treeline in high mountains. Gravelly and rocky terrain is generally prevalent. Grasses and sedges often form thick sod-like mats in meadows. Alpine environments are often harsh with intense UV light, extreme temperature fluctuation, and short growing season. Most alpine plants have unique adaptations that allow them to persist in the extremes of this environment (Billings 1974). Many grow in mats or cushions. Perennials predominate in the alpine flora, as the growing season is often too short for annuals to complete their life cycles (Strickler 1990).

Table B4-3. Threats to the Alpine Habitat Group

Threat	Number of Species Affected (of 14)
Wildlife trampling – mountain goats	4
Hiking – associated trampling	3
Ski Areas	3
Rock climbing	1
Roads	1
Recreational activities	1
Transmission lines	1

Trampling by wildlife (mountain goats), hiking, recreation, and roads appear to be the primary threats common to the alpine habitat group (Appendix F, Tables F-3, F-4, and F-5).

Subalpine Forest/Non-forest (7 species)
The subalpine is often defined as the transitional zone between montane forests and treeless alpine regions. Subalpine regions can be sparsely forested, grasslands, shrublands, or rock regions. The subalpine flora begins 8,000 to 10,500 feet in elevation in Northern Utah and Colorado (Strickler 1990), while much lower (6,000 to 6,500 feet in elevation) in northern Idaho and western Montana. Subalpine forest stands often grow in patches interspersed with open meadows.

Table B4-4. Threats to the Subalpine Forest/Non-forest Habitat Group

Threat	Number of Species Affected (of 7)
Wildlife trampling – mountain goats	1
Hiking – associated trampling	2
Ski Areas	1
Grazing – trampling by livestock	1
Recreational activities	1
Transmission lines	1

Trails/hiking (associated trampling), trampling by wildlife, trampling by livestock, and recreational activities appear to be the dominant threats to the subalpine habitat group (Appendix F, Tables F-3, F-4, and F-5).

Montane Forest (10 species)
Species in the montane forest habitat group were divided into 2 subgroups based upon their physiognomy and disturbance dependence and/or tolerance.

Montane Forest Open-gap Species. Montane forest gap species are defined as those species that occur in natural and artificial gaps or openings within forested habitats. These species are often followers of disturbance and many do not respond well to uncharacteristic disturbances, i.e. floods, landslides, and wildfire. Some species are found to increase with infrequent, small-scale disturbance, which create small patches throughout the landscape. Species in this group thrive with periodic disturbance followed by stable conditions. Disturbance events may allow for increased light to penetrate the forest gaps and create favorable conditions for new seedling establishment. Once established, stable conditions promote the growth of the seedlings to maturity and associated reproduction. This habitat group includes forest edge species or open canopy species that occur along artificial forest margins (e.g., stabilized roadsides, skid trails).

Table B4-5. Threats to the Montane Forest Open-gap Habitat Group

Threat	Number of Species Affected
Road construction	1
Urban development	1

Montane Forest Understory Species. Species in the montane forest understory habitat group require protected microclimates with shade, undisturbed substrates, and associated moisture. These species are often susceptible to disturbance and are typically poor recruiters after disturbance. Forest fragmentation, edge effects, changes in the moisture regime, and other microclimate alterations pose the greatest threats to the species within this grouping (Sierra Nevada DEIS 2000).

Table B4-6. Threats to the Montane Forest Understory Habitat Group

Threat	Number of Species Affected
Timber harvest – forest fragmentation, microclimate change	1
Activities associated with logging – including road construction, log decks	1

Threats to the two forest habitat groups include: road construction, urban development, and timber harvest activities (Tables 7 and 8, Appendix F, Tables F-3, F-4, and F-5).

Woodland (12 species)
The woodland habitat group is comprised of several different community types, which include juniper communities (*Juniperus scopulorum/Juniperus occidentalis*), maple woodlands (*Acer grandidentatum*), quaking aspen (*Populus tremuloides*) communities and mountain mahogany (*Cerocarpus ledifolius)* commununities. The species within this habitat group are all found in

open gaps interspersed within the woodland communities. These habitats range from mid- to high-elevations (3900 – 9800 feet).

Table B4-7. Threats to the Woodland Habitat Group

Threat	Number of Species Affected (of 12)
Grazing- trampling by livestock	1
Alteration of hydrologic regime	1
Urban development	1
Road construction	1
ORVs – associated activities	1

The threats common to the woodland habitat group include: trampling by livestock, roads, alteration of the hydrologic regime, outdoor recreation vehicles (soil compaction, vegetation destruction), and urban development (Appendix F, Tables F-3, F-4, and F-5).

Shrubland (12 species)

The shrubland habitat group is defined as those regions with less than 10 percent forest cover and greater than 15 percent shrub cover (Redmond, et al. 1997). These regions can be dominated by mesic or xeric. This habitat group includes portions of the sagebrush steppe and the Great Basin sagebrush desert (Taylor 1992). The shrubland habitat group encompasses a range of elevational distribution and may occur on a variety of substrates.

Table B4-8. Threats to the Shrubland Habitat Group

Threat	Number of Species Affected (of 12)
Grazing- trampling by livestock	2
Roads	1
ORV's	1
Urban development	1

The threats common to the shrubland habitat group include: trampling by livestock, road construction, outdoor recreation vehicles, and urban development (Appendix F, Tables F-3, F-4, and F-5).

High-elevation Grassland (2 species)

The grassland habitat is generally defined as open and continuous area dominated primarily by many types of grass species. Grasslands are defined as regions with less than 10 percent forest cover and less than 15 percent shrub cover, with herbaceous cover greater than 15 percent (Redmond, et al. 1997). In high-elevation grasslands, drainage patterns and moisture regimes allow for the establishment of many species not found in lower-elevation grasslands. The vegetation can differ greatly from drier, lower sites and include many species of sedges, grasses, rushes, and tall forbs. These high elevation areas are often used for grazing livestock later in the growing season, which may overlap with plants that are phenologically active later in the year.

Currently, no visits have been made into this plants habitat to determine threats (Franklin, 2000). All known locations, however, are on isolated mountain peaks or ridges, with only occasional recreational use (Table 11, Appendix F, Tables F-3, F-4, and F-5).

Riparian (10 species)

Riparian habitats are generally defined as those regions connected with or immediately adjacent to banks of streams, rivers, or other bodies of water, or having a moisture regime that promotes the establishment of species adapted to such environmental conditions. The riparian habitat was divided into several subgroups to adequately address the threats unique to each group. The riparian species fall into Riparian Conservation Areas (RCA), which are site-specifically determined corridors along streams (forested, non-forested, intermittent), and lakeshores, and include ponds, reservoirs, and wetlands. These RCAs are specially managed to protect aquatic and riparian resources.

Meadows, Seeps, and Vernally and Seasonally Wet Swales. Meadows and seeps are wet openings that contain grasses, sedges, rushes, and herbaceous forbs that thrive under saturated or moist conditions. These habitats can occur on a variety of substrates and may be surrounded by grasslands, forests, woodlands, or shrublands (Skinner and Pavlick 1994). This habitat group may also include vernally or seasonally wet habitats, which are depressions or swales with relatively impermeable soil that accumulate seasonal precipitation and run-off. These regions slowly dry up as temperatures increase through the season. Vernal pools and depressions in sagebrush scrub communities are included in this habitat. Annual herbs and grasses adapted to saturated conditions and early growth under water are predominant in these habitats (Skinner and Pavlick, 1994).

Table B4-8. Threats to the Meadow, Seeps, and Vernally or Seasonally Wet Swales Habitat Group

Threat	Number of Species Affected (of10)
Grazing - trampling by livestock	1
Alteration of hydrology	2
Roads	2
Ski areas activities	1
Hiking – associated trampling	1
Loss of pollinators	1
Facilities	1

Bogs, Fens, and Peatlands. Bogs and fens are wetlands that typically have sub-irrigated cold water sources. Peatlands are generally defined as wetlands with waterlogged substrates and at least 30 centimeters of peat accumulation (Moseley et al. 1994). The vegetation within these habitats is often dense and dominated with low-growing perennial herbs (Skinner and Pavlick 1994).

Table B4-9. Threats to the Bog, Fen, and Peatlands Habitat Group

Threat	Number of Species Affected (of10)
Grazing - trampling by livestock	1
Alteration of hydrology	2
Roads	1
Trails/hiking	1
Recreational activities	1
Non-native species invasion	1

The threats common to the four riparian habitat types include: trampling by livestock, alteration of hydrology, and roads (Tables 12 and 13; Appendix F, Tables F-3, F-4, and F-5).

Rock (25 species)

The geomorphology varies widely throughout the Wasatch-Cache National Forest. Much of the WCNF is comprised the very dissimilar Uinta Mountains and Wasatch Range and the Bear River Range. The Uinta Range is practically devoid of igneous rock. The Wasatch Range is comprised of unusual assembly of igneous, sedimentary, and metamorphic rock (Stokes 1988). Many of the rare species endemic to the Bear River Range are closely associated with the dolomite and limestone geologic formations. The rock habitat group has been divided into two main subgroups: 1) cliffs, crevices, and ledges, and 2) talus slopes and outcrops.

Cliffs, Crevices, and Ledges – Cliffs, crevices, and ledge habitats are defined as steep rock faces, with fissuring, drainage, and aspect characteristics that support plant establishment and growth. Species within this habitat group can be found on a wide range of rock types, moisture microclimates, and elevations. Recreational rock climbing in this habitat group is extremely popular and can pose major threats to species viability.

Table B4-10. Threats to the Cliff Habitat Group

Threat	Number of Species Affected (of 25)
Rock climbing	5
Trails/hiking	3
Plant collection – rock garden species	2
Pollution – dust from recreational roads and road expansion	2
Road construction	2
Wildlife trampling – mountain goats	1
Facilities	2
Ski area activities	1
Urban development	1

Talus and Scree Slopes, and Rock Outcrops – Talus slopes are defined as topographic irregularities covered with coarse gravel or boulders. These slopes tend to be unstable thus favoring the establishment of a particular combination of plants. The moisture regime for these rocky habitats is generally dependent upon channeling of precipitation and meltwater run-off. Rock outcrop habitats are composed of unweathered or slightly

weathered bedrock with plants establishing in small pockets of soil or between rock crevices. In this rock habitat subgroup, elevation ranges from 4,200 to upwards of 12,000 feet. These areas are often adversely affected by recreational activities, high elevation livestock use when plants are phenologically active, and natural conditions.

Table B4-11. Threats to the Talus and Scree Slopes and Rock Outcrop Habitat Groups

Threat	Number of Species Affected (of 25)
Wildlife trampling – mountain goats	3
Trails/ hiking - trampling	2
Urban development	1
Ski areas	2
Grazing - trampling by livestock	1
Recreational activities	1
Energy development	1
Transmission lines	1

The threats common to the rock habitat types include: recreational activities, wildlife trampling, urban development, and trampling associated with hiking (Tables 14 and15, Appendix F, Tables F-3, F-4, and F-5).

Rare and Unique Communities

Plant communities are defined as a repeating assemblage or grouping of plant species on the landscape (Winward 2000). Some classification systems refer to a plant community as the existing vegetation that currently occupies a site. Others use the potential vegetation that reflects the climax community at that site to define a community. Classifications based on existing vegetation may describe different seral stages as different communities, whereas those based on potential vegetation may include a variety of disturbance-induced or seral plant communities, but the climax community remains the same (Steele et al. 1981). The list of rare and unique communities within the Wasatch- Cache National Forest includes the Side-Slope Alder Communities that occur in Little Cottonwood Canyon, Ponderosa Pine communities that occur along the Mirror Lake Highway near the Provo River and Beaver Creek on the Kamas Ranger District, Bristlecone Pine communities in the Stansbury Mountains, Single Needle Pinyon in the Mollens Hollow Research Natural Area south of the Blacksmith Fork River, and possibly White Fir Communities, which are widespread in Utah, but are limited in Wyoming and have been noted on the north slope of the Uinta Mountains.

Traditional and Cultural Species of Interest to American Indians

Native plants have developed cultural significance with many human groups throughout time. Plants provide food, fiber, medicine, ceremonial, commercial, and other uses, many of which remain important today. The cultural uses of native plants and their associated communities often contributed to settlement and land use patterns. The users of these products hold considerable natural resource knowledge, including a variety of management techniques to foster the production and quality of certain plants. This knowledge continues to gain important recognition in managing public lands.

Special Forest Products

Special forest products are defined as "non-timber, renewable, vegetative natural resources that can be utilized either for personal or commercial use." They include mosses, lichens, ferns, pinecones, Christmas boughs, Oregon grape, wildflowers, mushrooms, huckleberries, Osha (*Ligusticum*), St. John's wort (*Hypericum*), cacti, parts of woody plants, and many more medicinal and ornamental species. The term "miscellaneous forest products" is reserved for timber-related products.

There is increasing recognition of the economic value of special forest products and their potential role in supporting diversification of forest-product dependent communities. The long-term strength of the industry depends on the sustainability of the resources being harvested, so this issue is closely linked to ecosystem health. Many National Forests across the United States have established Forest-wide direction for special forest products in order to ensure sustainable harvest, to track demand for these products, and to monitor impacts of harvest.

Collection of special forest products on a commercial scale in the Wasatch-Cache has been quite limited. However, increasing demand nation-wide for a variety of species has led to an increasing number of inquiries about commercially desirable species available on all Forest Service lands. Increased demand for the seeds of native species, roots and leaves of native and exotic species for medicinal purposes, and species used in the floral industry has become prevalent across the United States.

Unregulated or excessive harvest of special forest products could remove plants at a rate that exceeds growth and reproductive capabilities, resulting in declining species abundance and viability, overall impacts to the ecosystem, and a shift in plant communities and species diversity across the landscape.

The greatest known demand is for bracken fern fiddle heads by members of the local Korean community. Other demands are for plants with medicinal uses, including Osha, biscuit root, as well as others. There is also an increasing demand for commercial seed collection.

APPENDIX B - 5

Roads Analysis in Forest Planning

Introduction

Recognizing the importance of the road system for both its opportunities and costs, the Roads Analysis Process (USFS, 1999) was initiated at the forestwide scale as an inherent part of forest plan revision. The Forest Service must find an appropriate balance between the benefits of access to the National Forest and the costs of road-associated effects to ecosystem values. Providing road systems that are safe to the public, responsive to public needs, environmentally sound, affordable and efficient to manage is a top agency priority. Completing a roads analysis assessment is a key step to this. Roads analysis is an integrated ecological, social, and economic approach based on science for transportation planning of both existing and future roads. The analysis is scaleable, flexible, and driven by road-related issues important to the public and managers.

The analysis should be based on the best available scientific information about the ecological effects of roads, economics, social costs and benefits and contributions of roads to management objectives. Roads analysis is not a decision process; it will neither make land management decisions nor allocate land for specific purposes, because both require NFMA and NEPA based Forest and project planning. However, it will provide relevant information for those decisions. The analysis is both technical (effects, changes, consequences, processes) and policy decisions (values, priorities, risks, benefits, costs, losses). The public will be involved in decisions to reconstruct, decommission, and build new roads. Roads analysis also needs to be coordinated with other appropriate agencies.

Roads analysis is a six-step process:

1) Setting up the analysis
2) Describing the situation
3) Identifying issues
4) Assessing benefits, problems and risks
5) Describing opportunities and setting priorities
6) Reporting

This appendix provides a summary of the analysis process completed. The complete report is available in the planning records. It is also posted on the forest website at www.fs.fed.us/wcnf/forestplan/feis. For purposes of the FEIS the information compiled for Step 2, Describing the Situation, is located in the Affected Environment section in Topic 3, Roads and Access Management.

Objective

The objective of the Roads Analysis, on the Wasatch-Cache National Forest, is to systematically review roads, Maintenance Objective levels 3, 4, 5, on the Forest, identify potential

environmental threats and management benefits from individual road segments and to recommend management actions. Maintenance Objective levels 1 and 2 roads were not reviewed as part of this Forest Scale analysis, because of information and time constraints (see glossary for definitions of road maintenance levels).

This analysis is intended to provide rangers and the forest supervisor with the framework needed to support future road management decisions. It provides interdisciplinary teams and decision makers (District Rangers and the Forest Supervisors) the context for site specific analysis; sets priorities for more detailed analysis and program planning; and, identifies issues requiring further evaluation for both existing roads and roads which may be planned in the future. It also provides a threat and benefit rating for each road segment. Mapping these segments also allows decision makers to identify prioritized areas where site-specific roads analysis needs to occur.

Setting up the Analysis

Analysis Area/Scale

The analysis area is the Wasatch-Cache National Forest (WCNF) administrative boundary. The analysis focuses on classified arterial and collector roads (Maintenance Objective Levels 3, 4 and 5) currently shown on the Transportation Atlas and the Forest Service INFRA database.

Interdisciplinary Team

The team leader met with individual members of the interdisciplinary team (IDT) to better refine the issues and the analysis factors. The interdisciplinary team convened and reviewed each of the issues and factors used in the analysis. The team consisted of the following core members:

Renee Flanagan	Civil Engineer / Interdisciplinary Team Leader
Melissa Blackwell	Planning Group Leader
Charles Condrat	Hydrologist
Paul Cowley	Fisheries Biologist
Oscar Mena	Civil Engineer
Dave Hatch	Landscape Architect
Richard Williams	Wildlife Biologist

Plan for the Analysis

The IDT described the existing condition; identify issues; determined threats (costs), assess benefits, and identified management recommendations.

The team followed law, policy and direction found in the*; Final Rule* and *Forest System Transportation System; Final Administrative Policy* as published in the Federal Register on January 12, 2001; *36 CFR Part 212; Forest Service Manual (FSM) 7700; Forest Service Handbook (FSH) 7709;* and *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System.*

Appropriate for this Forest-scale analysis, the team used existing information and data. Key sources of information and data included:

- The Forest's transportation management system database (INFRA). (Not all roads that have been constructed or decommissioned over the past three years may have been identified as being constructed or decommissioned in the INFRA database.)
- The Forest's Geographic Information System (GIS) layer. (Not all roads that have been constructed or decommissioned may have been identified as being constructed or decommissioned in the GIS system).
- Road condition surveys
- District Transportation Plans
- Professional knowledge and experience of Forest personnel

This information and data was utilized to describe the existing condition and develop issues. The issues identified were:

- Watershed health, riparian function, and aquatic species
- Terrestrial wildlife species
- Access
- Road maintenance costs

For each issue, factors were developed, which included a description of indicator and associated measurement parameter(s). Issues with multiple factors were evaluated and given an overall rating based on criteria.

Each road segment was then evaluated and assigned an overall cost/threat rating of low, moderate or high and a benefit rating of low, moderate or high. Based on those results specific recommendations and priorities were made regarding the road segment. These results and analysis, of issues for the transportation system, will provide the framework to develop recommendations for road and forest management.

This analysis is intended to provide direction and consistency in the evaluation of the road system at the Forest-scale and road segments at the watershed scale independent of project team assigned to analysis. Prior to making specific road management decisions, analysis teams will usually need to include ML roads 1 and 2, and validate the individual road segment data and opportunities as well as consider additional localized issues. At that time, overall ratings for each road segment are placed within a matrix that evaluates threats on one axis and benefit on the other. Each box in the matrix has been assigned a primary management opportunities (PMO), which include retain, decommission, or further evaluation needed. Additional issues with associated factors, as well as, secondary management opportunities (SMO) to consider for a finer-scale analysis are also provided.

The team prepared a report of their findings, that specifically includes the following items:

- An inventory and map of all classified maintenance levels 3,4 and 5 roads and display how these roads are to be managed.
- Provide guidelines for addressing road management issues and priorities related to retaining, decommissioning and maintaining roads.

- Identify significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions.
- Document coordination efforts with other government agencies and jurisdictions.
- Provide guidance and information needs for future analysis at watershed or project scale including unclassified roads that may exist on the Forest.
- Any other specific information that may be needed to support/inform the current Forest Plan Revision.

Issue Identification

Process

Issue identification is based on present and future anticipated access needs, current road conditions, impacts on the environment due to existing and planned roads and their associated activities, and current and projected funding.

Public involvement in issue identification was assessed from input to the Forest Plan Revision and district level transportation planning. Public scoping in Forest Planning process has shown that many of the roads are of interest and value to the public. Some of the public wants existing roads improved for travel by standard passenger vehicle. Others want them left as they are. While other want old routes reopened and new routes constructed for motorized and mechanized recreation opportunities. There is also a portion of the public that want existing roads closed and roadless areas to remain closed to protect roadless values and provide for wildlife and watershed values. Transportation planning at the district level has provided input for social consideration such as historical, existing and desired future uses. Contact with local Counties has shown some interest in mutually beneficial partnerships for road maintenance and the need to provide access and connectivity of transportation network.

The extent of issues range in scale from Forest-wide, district, watershed and project level. Issues at the project level are not necessarily appropriate to address at the Forest level and vice-versa. Since this analysis is to provide specific management opportunities and recommendation for standard passenger vehicle travel (ML 3-5), those issues are listed under Forest-scale. The other intent is to provide direction for future roads analysis of classified and unclassified roads at district, watershed and project level. Issues raised relative to those levels are listed under sub-forest scale.

Forest Scale Issues

Natural Resource Impacts.
To what extent does the road system affect watershed health, riparian habitat, and aquatic species?

- Relationship between watershed health and road segments
- Risk to riparian habitats based on road location
- General effects from erosion and sedimentation to water quality and aquatic species
- Loss of connectivity for aquatic species due to stream crossings

To what extent does the road system affect terrestrial wildlife species and habitat?

- Is road density a factor
- Habitat fragmentation for critical winter and spring range
- Presence and relationship to TES/MIS species

Access.

What is the primary purpose and use of the road system?

- In terms of access to non-Forest Service lands and agreements
- To and through National Forest System (NFS) lands for developed and undeveloped recreation opportunities.
- In terms of managing National Forest System lands.

Does the road system provide needed connectivity?

- To State and County transportation systems
- To and through National Forest System (NFS) lands for recreation opportunities, land management and private in-holdings
- In terms of existing and planned road management objectives

Does the road system provide legal public access to NFS lands?

- Current needs to acquire legal right-of-way across private, state, and other Federal lands.

Are FSRs and connected road system under appropriate jurisdiction?

- Many FSRs cross private land and development of these lands has increased, assess need for roads to be conveyed to local public road authority.
- RS 2477 road assertions of counties. Have these been identified and how will they be incorporated into analysis.

Road Maintenance.

Road maintenance funding is not adequate to maintain the existing or planned road system.

- Annual maintenance costs
- Deferred maintenance costs and status of road system

What are the potential and available sources of road maintenance funding?

- Commercial users
- Shared road maintenance agreements with local Counties
- Forest Highway designation where appropriate to be eligible for Federal Highway Administration funding.
- Roads designated as potential Public Forest Roads (PFSR).

Sub-Forest Scale Issues

Natural Resource Impacts.

What extent does each road segments affect watershed health, riparian habitat, and aquatic species?

- Is road a risk to BCT/CCT habitat
- Presence and relationship to TES/MIS
- Placement and location of road crossing structures in terms of aquatic habitat connectivity

- In terms of unstable soils, slope stability, landslides, mass wasting, fishing and stocking ability

What extent does the road system and road segments affect terrestrial wildlife species and habitat?

- Presence and relationship to TES/MIS
- Intensity of road use and road kill

What extent does the road system and road segments affect vegetation?

- Fragmentation of species
- Potential spread, invasion or control of exotic species
- Presence and relationship to TES/MIS

Access.

Does the road system provide needed and planned access?

- Relative to other motorized and non-motorized activities including trailheads, developed and undeveloped recreation sites.
- Relative to private inholdings
- Relative to increased access needs for winter recreation.
- Relative to seasonal closure.

Does the road system provide legal public access to NFS lands?

- Is public access denied or blocked by landowners.

Funding.

Road maintenance funding is not adequate to maintain the existing or planned road system.

- Funding is increasing for decommissioning of roads, but majority of roads to be obliterated are unclassified user-created roads.
- Work has been specific to health and safety and limited annual maintenance activity is increasing deferred maintenance costs.

Assessing Benefits, Problems and Risks

Process

To evaluate the current road system the IDT evaluated the existing condition and identified issues. The primary issues are access; watershed health, riparian habitat, aquatic species; terrestrial wildlife; and maintenance cost. Each issue has multiple factors. Each factor contributing to the evaluation of the associated issue includes a description of indicator and associated measurement parameters. The indicator is a specific description of how the factor will be evaluated relative to the road system. The measurement parameter includes a value rating for each factor based on range of results available from the developed indicator. Issues with multiple factors are evaluated based on weighted values and given an overall rating (low, medium or high).

Watershed Health, Riparian Habitat and Aquatic Species

Four factors were identified for evaluation:

(1) Loss of riparian function, including filtering of water, stream shade and recruitment of large woody material and detritus into the stream from riparian area;
(2) Increase sediment loading from the roads;
(3) Loss of connectivity and accessible habitat as a result of improper installation of road culverts; and
(4) Potential for pollutants to enter stream from hazardous material transport.

A full description of indicators, their associated measurement parameters, data limitations and analysis results are available in the complete report.

Terrestrial Wildlife

Three factors were identified for evaluation:

(1) Road location relative to road density;
(2) Types of habitats traversed by roads;
(3) Intensity of road use.

A full description of indicators, their associated measurement parameters, data limitations and analysis results are available in the complete report.

Access

Five factors were identified for evaluation:

(1) Private Access;
(2) Public Access;
(3) Administrative Access;
(4) Connectivity; and
(5) Outstanding Rights

A full description of indicators, their associated measurement parameters, data limitations and analysis results are available in the complete report.

Maintenance Costs

Six factors were identified for evaluation:

(1) Commercial use and contributing funds;
(2) Shared road maintenance agreements;
(3) Forest Highway designation;
(4) Public Forest Service Roads (PFSR);
(5) Annual maintenance costs; and
(6) Deferred maintenance costs.

A full description of indicators, their associated measurement parameters, data limitations and analysis results are available in the complete report.

Management Opportunities and Priorities

Evaluation Process

To provide management opportunities and set priorities the IDT assessed issues and determined which were costs and benefits associated to the road system. The ratings of each issue were combined to provide an overall cost and benefit rating of low, moderate or high for each road. Based on those results priorities are made regarding each road segment. These results lay the framework to develop goals, objectives, standards and guidelines that will be incorporated into the Forest Plan regarding the Transportation System.

After review by line officers, incorporation of local factors, and any subsequent evaluation, the combined cost/risk and benefit ratings are placed within a Road Cost-Benefit Matrix. A primary management opportunity is then assessed to each road segment based on where it is located in the matrix. In addition, secondary management opportunities (SMO) are assigned to each road segment based on PMO assigned.

Road Related Costs and Benefits

Costs. The cost of a road segment was viewed as the threats associated with issues identified under watershed health, riparian function, aquatic species (WRA) and terrestrial wildlife (TW). Threats to WRA rating is considered equal with the threats associated with TW. The following is criteria for the overall cost rating assigned to each road segment. Overall cost rating for each road segment is available in the Management Opportunity in the complete report.

High: WRA = High or TW = High
Moderate: WRA=Moderate and TW=Moderate; or WRA=Moderate and TW=Low; or WRA=Low and TW=Moderate;
Low: WRA= Low AND TW = Low

Benefits. The overall benefit of a road segment includes issues identified under access (ACCESS) and maintenance costs (RM). In general, overall access rating is considered equivalent to maintenance costs. The following is criteria for the overall benefit rating assigned to each road segment. Overall benefit rating for each road segment is available in the Management Opportunity in the complete report.

High: ACCESS = High or RM = High
Moderate: Access=Moderate and RM=Moderate; Access=Moderater and RM=low; or Access=Low and RM=Moderate
Low: ACCESS = Low and AND RM= Low

Priorities. A priority for evaluation of primary and secondary management opportunities is assigned to each road segment based on overall cost and benefit rating. The complete report provides a priority rating for each road segment evaluated**.** Priority criteria is as follows:

A: Costs/threats = High OR Benefit = Low
B: Costs/threats = Moderate AND Benefit = Moderate OR High
C: Costs/threats = Low AND Benefit = Moderate
D: Costs/threats = Low AND Benefit = High

Road Cost-Benefit Matrix. This matrix places the results from analysis in one of nine boxes that shows the relationship between overall cost and benefit associated with each road segment evaluated.

Cost

Benefit	Low	Moderate	High
High	**H,L**	**H,M**	**H,H**
Moderate	**M,L**	**M,M**	**M,H**
Low	**L,L**	**L,M**	**L,H**

PMO
- Retain
- Decommission
- Further Evaluation

Primary Management Opportunities (PMO)

Primary Management Opportunities (PMO) are based on comparing cost and benefit rating for a road segment. PMOs give each road a preliminary rating of retain, decommission and further evaluation needed. This allows for the identifying and prioritizing detailed analysis areas based on the PMO's identified. Site specific analysis will be required to validate the costs and benefits prior to identifying a road for retention or decommissioning. An analysis of the ML 1 and 2 roads would also need to be completed at the site specific scale prior to decommissioning a road to verify that a ML 1 or 2 road is not isolated because of a decision on a ML 3-5 road. The following are the definitions of primary management opportunities (PMO) and their associated criteria for each road segment based on location within the Road Cost-Benefit Matrix. Each PMO is visually displayed on the matrix above. Typically these will be identified at the sub-Forest scale, but if it is determined that enough analysis at the Forest scale was completed, PMOs may be assigned.

Decommission (D) – Road is currently closed or evaluate for closure, conversion to another use or obliteration and current assessment deems road **may not** be essential for Forest

access and management. Prior to treatment a site-specific scale analysis would need to take place.

Retain (R) – Road is deemed essential for Forest access and management at the forest-scale. Site-specific scale information would need to be validated to justify the PMO rating.

Further Evaluation Required (FE) – There is not enough information or data available to adequately evaluate and make an informed recommendation. Information at the Site specific scale needs to be collected and may warrant further action.

Secondary Management Opportunities

In addition to PMO, the following secondary management opportunities (SMO) may be assigned to each road segment. SMO's are most appropriately assigned at the site specific analysis scale. SMO's associated with road decommission may include evaluation for closure, conversion, and obliteration. SMOs associated with retain may include improve, maintain, realign, reconstruct and private road. Additional SMOs that can be associated with retaining the road are listed below.

Close (CL) – Evaluate road for closure.

Convert (CV) – Evaluate road for conversion.

Drainage Structures, Add (DA) – Add additional drainage structures to alleviate concentrated flows. Structure shall be placed in areas that support adequate filter and dissipation capabilities.

Drainage Structures, Replace (DR) – Replace existing drainage structures with structures that will adequately dissipate flows and facilitate minimum maintenance.

Harden Surface (H) – Harden surface of entire road segment with crushed aggregate base or asphalt.

Harden Surface Next to Creek (HC) – Harden portions of road segments that are within 300 feet of drainages including crossings.

Reconstruct Road (RR) – Reconstruct road segment on existing alignment to change the road's functional class, maintenance level, traffic service level, capacity, or its original design function.

Maintain (M) – Continue to maintain road segment at the current functional class, maintenance level, traffic service level, capacity and design function.

Obliterate (O) – Evaluate road segment for obliteration.

Private (P) – Road access private land or is privately owned. If additional recommendations are present consult landowners or special-use permit holders.

Realign Road (RR) – Reconstruct road segment or portions of road segment in a new location and treat old roadway. Typically, this is to increase the road's functional class, maintenance level, traffic service level, capacity, change its original design function or reduce environmental damage.

Seasonal Road Closure (SC) – Evaluate road closure from late fall through early spring to winter range, road surface, and/or prevent resource damage.

Tables within the report provide a location to assign PMO and SMO(s) once evaluated at the sub-Forest scale. SMOs are associated with specific issue and/or factor ratings and are at the

discretion of the IDT. The IDT should list the issue or factor for selection of SMO(s) in the comment column of the management opportunity table if they differ from selection criteria.

APPENDIX B - 6

Recreation Opportunity Spectrum (ROS) and Winter Recreation Mapping

Introduction

The identification and delineation of experience, activities, and settings of outdoor recreation on the Forest used the framework of the Recreation Opportunity Spectrum (ROS) for summer use. The process that was used in defining the existing condition and development of the alternative is described below.

Six mapping criteria from the ROS framework inventory were used to develop Existing Condition maps. They are:

Physical setting

1. Remoteness
2. Size
3. Evidence of humans

Social and Managerial Setting

4. User Density
5. Managerial regimentation and noticeability
6. Setting Inconsistencies

Resource Specialists and District Personnel were used throughout the mapping process to assist in mapping consistencies and determine where inconsistencies occurred and help in the resolution conflicts and final mapping.

Alternatives used the existing condition map as a baseline and changed in response to management prescription and other factors identified by the public and Forest personnel. Maps of the Alternatives and Existing Condition are found in the FEIS. The following sections describe the process in more detail.

Summer ROS Mapping

Criteria 1. Remoteness

Using GIS, travel ways consisting of roads and trails were divided into categories of motorized and non-motorized. For roads, more detailed parameters were identified using the Forest Service Handbook (FSH) Transportation Management descriptions of maintenance levels (see table B6-A). A maintenance level of 0 was created for roads that were managed by other agencies or the private sector. Road maintenance levels were than segregated into primitive and better than

primitive. Maintenance level 1 is closed to public use and was considered as a non-motorized travel way. Maintenance level 2 was categorized as primitive and Maintenance levels 0, 3, 4, and 5 were categorized as better than primitive. After the classification of travel ways occurred the following criteria was applied to the motorized segments to map the inventoried Remoteness area into ROS categories.

Table B6-A Transportation Maintenance Levels

Parameters	MAINTENANCE LEVEL					
	0	1	2 (Primitive)	3	4	5
Service life	Other agency or private road	Intermittent Service-Closed Status	Constant Service or Intermittent Service-Open Status (Some uses may be restricted under 36 CFR 261.50)			
Traffic Type	Varies	Open for non-motorized uses. Closed to motorized uses.	Administrative, permitted, undeveloped recreation, specialized, commercial haul	All National Forest Traffic – General Use, Commercial Haul		
Vehicle Type	All types	Closed-N/A	High clearance, pick-up, 4X4, log trucks, ATV, etc.	All types – passenger cars to large commercial vehicles		
Traffic Volume	Varies w/surface as maintained by other agency or private	Closed-N/A	Traffic volume increases with maintenance level			
Typical surface	Varies w/surface as maintained by other agency or private	All types	None, Native, or Aggregate-may be dust abated		Aggregate – usually dust abated; paved	
User comfort and convenience	Varies	Closed-N/A	Not a consideration	Low priority	Moderate priority	High Priority
Functional Classification	All types	All types	Local Collector	Local Collector Arterial	Local Collector Arterial	Local Collector Arterial
Traffic Service	All types	All types	D	A,B,C – Traffic service level increases with maintenance level		
Traffic Management	All types	Prohibit or Eliminate	Discourage or prohibit cars. Accept or discourage high clearance vehicles	Encourage, Accept	Encourage	Encourage

Note:
1. Maintenance level 0 represents all non-Forest Service roads that are maintained by other agencies or public with public access.
2. For maintenance level 1-5 the descriptions are taken from table 12.3 exhibit 1, Forest Service Handbook (FSH) 7709.58 – Transportation System Maintenance Handbook, WO Amendment 7709.58-92-1 effective 9/4/92

Wilderness was categorized into two ROS classifications: Wilderness/Primitive (W/P) and Wilderness/Semi-Primitive Non-Motorized (W/SPNM).

W/P areas were mapped as areas 3 miles and greater from all roads, railroads, and motorized trails.

W/SPNM areas were mapped as areas less than 3 miles and more than ½ mile from all roads, railroads, and motorized trails.

Semi-Primitive Non-Motorized (SPNM) were mapped by delineating General Forest Areas (GFA) less than 3 miles and more than ½ mile from all roads, railroads, and motorized trails.

Defining a ½ mile buffer on each side of all motorized trails and primitive roads created a ROS category of Semi-Primitive Motorized (SPM).

Roaded Natural (RN) areas were distinguished by shaping a ½ mile buffer on all better than primitive roads.

Rural (R) has no distance criteria. *Boundaries were delineated by defining lands whose setting characteristics are Rural were the" natural environment has been substantially modified, i.e., structures are readily apparent, pastoral, or agricultural or intensively managed wildland landscapes as viewed from visually sensitive roads and trails." (FS-710) Includes such characteristics as pastoral, agricultural, intensively managed wildlands. No buffers are used.*

Urban (U) has no distance criteria. *Boundaries were delineated by defining lands whose setting characteristics are Urban were the environment is Urbanized " with dominant structures, traffic lights, large parking lots, and paved streets. Access is highly intense, motorized, and often with mass transit supplements." (FS-710) Includes such characteristics as major resorts, marinas, residential subdivisions, industrial sites, and urbanized amenities that are associated with these characteristics. No buffers are used.*

The Table B6-B matrix was used to determine the ROS category when conflicts between ROS categories occurred.

Table B6-B ROS Category Conflict Adjustment Matrix

	W/P	*W/SPNM*	*SPNM*	*SPM*	*RN*	*R*	*U*
W/P	*W/P*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*
W/SPNM	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*	*W/SPNM*
SPNM	*W/SPNM*	*W/SPNM*	*SPNM*	*SPM*	*RN*	*R*	*U*
SPM	*W/SPNM*	*W/SPNM*	*SPM*	*SPM*	*RN*	*R*	*U*
RN	*W/SPNM*	*W/SPNM*	*RN*	*RN*	*RN*	*R*	*U*
R	*W/SPNM*	*W/SPNM*	*R*	*R*	*R*	*R*	*U*
U	*W/SPNM*	*W/SPNM*	*U*	*U*	*U*	*U*	*U*

Wilderness/Primitive = W/P
Wilderness/ Semi-Primitive Non-Motorized = W/SPNM
Semi-Primitive Non-Motorized = SPNM
Semi-Primitive Motorized = SPM
Roaded Natural = RN
Rural = R
Urban = U

Criteria 2. Size

ROS categories created polygons of an area that were measured in acres and analyzed to see if they met the following criteria.

Wilderness/Primitive (W/P)- Areas 5,000 acres or greater. (May be smaller if contiguous to W/SPNM).

Wilderness/Semi-Primitive Non-Motorized (W/SPNM) – No size criteria. Remaining Wilderness not in Primitive.

Semi-Primitive Non-Motorized (SPNM) – Non-Motorized areas less than 5,000 acres and greater than 2,500 acres or GFA. (May be smaller if contiguous to W/P or W/SPNM).

Semi-Primitive Motorized (SPM) – Motorized high clearance vehicle areas greater than 2,500 acres of GFA. (May be smaller if contiguous to W/SPNM and SPNM).

Roaded Natural (RN) – No size criteria.

Rural (R) – No size criteria.

Urban (U) – No size criteria.

After the area adjustments were completed in GIS, the ROS category polygons were labeled with the appropriate categories and readied for the next step of the process.

Criteria 3. Evidence of Humans

To determine whether the impact of human modification on the landscape was appropriate for each ROS category an analysis was made by overlaying areas of development and activities. If the evidence of humans was dominant, an adjustment was made to the appropriate ROS category. See Table B6-C for Evidence of Human Criteria. Management Prescription Categories (MPC) were used to show Wilderness opportunity classes I, II, and III, and categorize ROS categories W/P and W/SPNM.

Table B6-C Evidence of Human Criteria

ROS Class	Setting	Travel ways	Structures
Wilderness/Primitive	Setting is essentially an unmodified natural environment. Evidence of Humans would be unnoticed by an observer wandering through the area. MPC 1.1 - Opportunity Class I **Local adjustment:** May have the sites and sounds of commercial and non-commercial flight corridors.	Some evidence of trails, but should not exceed standard to carry expected use.	Structures are rustic and extremely rare.
Wilderness/ Semi-Primitive Non-Motorized	Setting is essentially an unmodified natural environment. Evidence of Humans would be unnoticed by an observer wandering through the area. MPC 1.1 - Opportunity Class I, MPC 1.2 - Opportunity Class II, MPC 1.3 – Opportunity Class III. **Local adjustment:** May have the sites and sounds of adjacent urban and rural communities.	Evidence of trails, but should not exceed standard to carry expected use.	Structures are rustic and extremely rare.
Semi-Primitive Non-	Natural setting may have subtle	Evidence of trails, little or no	Structure are rare and isolated.

ROS Class	Setting	Travel ways	Structures
Motorized	modifications that would be noticed, but not draw the attention of an observer wandering through the area. **Local adjustment:** May have the sites and sounds of adjacent urban and rural communities.	evidence of primitive roads and the motorized use of trails and primitive roads.	
Semi-Primitive Motorized	Natural setting may have moderately dominant alterations, but would not draw the attention of motorized observers on trails or primitive roads within the area. **Local adjustment:** May have the sites and sounds of adjacent urban and rural communities.	Strong evidence of primitive roads and the motorized use of trails and primitive roads	Structures are rare and isolated.
Roaded Natural	Natural setting may have modifications, which range from being easily noticed to strongly dominant to observers within the area. However from concern level 1 and 2 of the Scenery Management System (Scenic Byways, Backways) and use areas these alterations would remain unnoticed or visually subordinate. **Local adjustment:** May have the sites and sounds of adjacent urban and rural communities.	There is strong evidence of designed roads and/or highways.	Structures are generally scattered, remaining visually subordinate or unnoticed to sensitivity level 1 and 2 VMS identified travel route observer. Structures may include power lines, microwave installations and so on.
Rural	Natural setting culturally modified to the point that it is dominant to the concern level 1 and 2 of the Scenery Management System (Scenic Byways, Backways) travel route observers. May include pastoral, agricultural, intensively managed wildland resource landscapes, or utility corridors. Pedestrian or other slow moving observers are constantly within view of culturally changed landscape.	There is strong evidence of designed roads and/or highways.	Structures are readily apparent and may range from scattered to small dominant clusters including power lines, microwave installations, local ski areas, minor resorts and recreation sites.
Urban	Setting is strongly structure dominated. Natural or natural-appearing elements my play an important role, but visually subordinate. Pedestrian and other slow moving observers are constantly within view of artificial enclosure spaces.	There is strong evidence of designed roads and/or highways and streets.	Structures and structure complexes are dominant, and may include major resorts and marinas, national and regional ski areas, towns, industrial sites, condominiums or second home developments.

Criteria 4. User Density/Social Contact and Criteria 5. Managerial Regimentation and Noticeability

After mapping with criteria 1 through 3 described above, meetings were schedule with District personnel to review how the criteria were applied and get their feedback. Some modifications were made to the maps based on the District personnel's individual knowledge.

In these meetings District personnel were also asked to determine:

A. how many people visited an area from their experience to establish user density? This information was based ocular data and not further developed in the mapping process. See Chapter 2, Alternatives Considered But Eliminated From Detailed Study, Human Carrying Capacity Determinations and User Densities.

B. consider the amount of signs and visitor contacts by Forest Service rangers to frame regimentation and noticeability (See Table B6-D Managerial Setting Criteria).

From this professional knowledge areas were mapped and compared with other criteria.

Table B6-D Managerial Setting Criteria
(Managerial regimentation and noticeability)

ROS Category	Criteria description
Wilderness/Primitive	MPC 1.1 Opportunity Class I – On-site regimentation is low with controls* primarily off site.
Wilderness/ Semi-Primitive Non-Motorized	MPC 1.2 and 1.3 Opportunity Class II and III – On-site regimentation is low to moderate* primarily off site.
Semi-Primitive Non-Motorized	On-site regimentation and controls* present but subtle.
Semi-Primitive Motorized	On-site regimentation and controls* present but subtle.
Roaded Natural	On-site regimentation and controls* are noticeable, but harmonize with the natural environment.
Rural	Regimentation and controls* obvious and numerous, largely in harmony with the man made environment.
Urban	Regimentation and controls* obvious and numerous.

*Controls can be physical (such as barriers) or regulatory (such as permits).

Criteria 6. Setting Inconsistencies

Based on review and adjustment from local knowledge, an existing condition map was produced. When the physical, social and/or managerial setting were not the same for the same piece of ground in the GIS maps the ROS category was selected that best represented current management direction.

Inconsistencies and adjustments:

1. Maintenance level 0 roads represented a wide range of road widths and surface types. District personnel knowledge was sought to classify the primitive roads so that they could be mapped in GIS correctly for the Remoteness Criteria of SPM.
2. The influence of adjacent urban and rural communities to the boundary of the Forest created a ring of urban and rural polygons in their interface with the Forest. After some review it became evident that management direction did not reflect urban or rural setting on these lands so the ROS category was moved to a maximum of Roaded Natural, but for the most part they became SPM or SPNM areas.
3. Because of the location of Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak and Mount Naomi Wildernesses to urban and rural communities and better than primitive roasd (less than 3 miles) the designation of W/SPNM was applied to MPC 1.1, 1.2 and 1.3.

Alternatives and ROS

Applies to all Alternatives

Management Prescription Categories (MPC's) 1.1-1.5 will have only the non-motorized ROS application applied to them. Most 2.6 MPC designations will be non-motorized and semi-primitive (motorized or non-motorized) in nature.

MPC 1.5, Recommended Wilderness is delineated as SPNM, the MPC direction will provide the specific management for this portion of the ROS category.

MPC's 4.3, 4.4, 4.5, 5.2, 6.2 will generally have a motorized access classification applied to them (SPM, RN, R, U).

Alternative 1

Management objective is to maximize SPNM and Wilderness. Generally, the Wilderness/Primitive class will not be increased beyond High Uintas Wilderness region, because most areas will not meet Wilderness/Primitive criteria in any alternative due to the remoteness and social setting.

Buffered existing motorized routes (summer) within MPC 1.5 to 66 feet. (66 feet buffer was adopted from the roadless criteria). This buffer narrowed cherry-stemmed corridors while increasing MPC 1.5 acreage in SPNM. There is no SPM or greater developed designations in MPC 1.5 or 2.6.

Increase SPNM area outside of 1.5 and 2.6 MPC's if possible. Use a ¼ mile buffer for those areas outside of MPC 1.5 designations. No new recreation facility development.

Alternative 2

Similar to Alternative 1. Use a ¼ mile buffer for motorized routes. Incorporate as much SPM designation as possible for MPC's 4.3, 4.4, 4.5, 5.2, 6.2. Facility development may be allowed if consistent with ROS designation and management prescription.

Alternative 3

ROS map should be similar to the current condition map. Facility development may be allowed if consistent with ROS designation and management prescription.

Alternative 4 - 1985 Forest Plan ROS

Only one ROS map was developed for the Forest in the 1985 Forest Plan that combined both summer and winter use. This map is provided to show the change in ROS management.

Generally, the management philosophy was to increase recreational development and access, and add some developed recreation sites. In the initial round of planning ROS was applied in a more general nature and reflected a higher development scale.

Alternative 5

More development is allowed. This does not necessarily translate into fewer SPNM acres, but since there is more acreage allocated to MPC's with development potential such as 4.5, 5.2, 6.2, 8.0, it is likely there would be less SPNM in this alternative.

Alternative 6

The ROS map is similar to the current condition map. Allows additional facility development, especially in MPC 4.+ (recreation) classes.

Alternative 7

ROS map is same as existing condition with the exception of changes from Road Natural to Rural in the ski areas because of the increased use of mountain bike trail development and day hikes from Resort base areas.

Table B6-E Social Setting Criteria were developed and used in the creation of Table 11 WCNF Revised Forest, and Table D2-1 Appendix D settings and opportunity descriptions for identified ROS classes. The social setting criteria were shaped from District personnel professional knowledge, field observations, visitor counts, High Uinta Wilderness Management Plan, and Special Orders of the WCNF Forest Supervisor as a baseline to establish social encounter thresholds for Primitive and Semi-Primitive ROS classes.

There are three reasons to establish social encounters thresholds:

a. For a communication tool to help people understand more about their desired recreation experience.
b. To establish a baseline for management and the public for the collection of social data.
c. To provide a beginning point to initiate public involvement during the monitoring process.

It is recognized that further data collection will need to be collected during the monitoring process, such as date, time of contact, duration of contact, speed of hiking, etc. so that a better understanding of peoples recreational trends and desire experience can be created. The description (Very Low – High) of encounters is ROS category specific and changes meaning when moving from one class to another. See Table B6-E criteria description for definition of the percent a person time is spent in encounters with other parties. A party is defined as 1 person to 14 people.

Table B6-E Social Setting Criteria

ROS Class	Criteria description
Wilderness/Primitive	High Uintas
	MPC 1.1, Wilderness Opportunity Class I. Social: Off Trail -Very Low encounters (less than 10% of a person time is spent in encounters with other parties in an 8- hour day) on Trail-Low encounters (11%-15% of a person time is spent in encounters with other parties in an 8- hour day) Campsites should not be closer than 1 mile apart.
Wilderness/ Semi-Primitive Non-Motorized	Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak, Mount Naomi and Wellsville Mountain Wildernesses
	MPC 1.1. Wilderness Opportunity Class I. Social: Off and On Trails Low encounters (11%-15% of a person time is spent in encounters with other parties in an 8- hour day). Campsites should be no closer than 100 feet apart.
	High Uintas
	MPC 1.2 & 1.3, Wilderness Opportunity Class II and I. Social: On Trail-Low encounters (11%-15% of a person time is spent in encounters with other parties in an 8- hour day) High Uintas - Campsites should be no closer than ¼ mile apart. Mount Naomi and Deseret Peak, Mt. Olympus, Twin Peaks, and Lone Peak Wildernesses- Campsites should be no closer than 100 feet apart.
	Local adjustment for weekends and holidays: High Uintas, Wellsville Mountain, Mount Naomi and Deseret Peak Wildernesses
	MPC 1.2. Social: On Trail- Moderately Low encounters (16%-20% of a person time is spent in encounters with other parties in an 8- hour day)
	***Local adjustment for weekends and holidays:** Mt. Olympus, Twin Peaks, and Lone Peak Wildernesses
	MPC 1.2. Social: On Trails-Moderate encounters (21%-25% of a person time is spent in encounters with other parties in an 8- hour day)
	Local adjustment for weekends and holidays: High Uintas, Wellsville Mountain, Mount Naomi and Deseret Peak Wildernesses
	MPC 1.3. Social: On Trails-Moderate encounters (21%-25% of a person time is spent in encounters with other parties in an 8- hour day)
	Local adjustment for weekends and holidays: Mt. Olympus, Twin Peaks, and Lone Peak Wildernesses
	MPC 1.3. Social: On Trails-High encounters (31%45% of a person time is spent in encounters with other parties in an 8- hour day) Campsites should be no closer than 100 feet apart. Reason for high encounters is because access to a desired destination is on a cherry stem trail.
Semi-Primitive Non-Motorized	Social: On Trails-Low to Moderate (14%-33% of a person time is spent in encounters with other parties in an 8- hour day). Camp Spacing-6 parties visible from campsites.
	Local adjustment for weekends and holidays
	Check with local Ranger Districts for information on trails with High encounters with other parties.
Semi-Primitive Motorized	Social: Low to moderate contact frequency on Loop trails, moderate contact frequency on cherry stem trails (21%-40% of a person time is spent in encounters with other parties in an 8-hour day)
	Local adjustment for weekends and holidays
	Check with local Ranger Districts for information on trails with High encounters with other parties.
Roaded Natural	Frequency of contact is moderate to high on roads; Low to moderate on trails and away from roads; low to moderate in developed sites during the week and moderate to high on weekends and holidays.
Rural	Frequency of contact is moderate to high in developed sites on roads and trails and water surfaces during the week and high to very high on weekends and holidays and moderate away from developed sites.
Urban	Large numbers of users onsite and in nearby areas.

Winter Recreation Mapping

Mapping Process

The following paragraphs describe the process used to develop winter recreation existing condition and alternative maps. The delineation and identification of winter motorized and non-motorized recreation activities on the Forest used questions to frame the process for building the existing condition map. A interdisciplinary team develop the following questions that needed to be answered:

- Where can I snowmobile?
- Where is helicopter skiing allowed?
- Where is winter motorized use not allowed?

Question 1 -Where can I snowmobile?

Existing District summer and winter recreation travel plans were separated into the two categories and put into GIS. Through public interaction and Forest personnel review, motorized areas were identified and mapped.

Question 2 -Where is helicopter skiing allowed?

Existing permit boundaries were put into GIS.

Question 3 - Where is winter motorized use not allowed?

Wilderness and areas closed during the winter on travel plans were later defined along with areas of trespass where motorized use was occurring in non-motorized areas.

Fundamental to beginning this process is determining when during the season the winter recreation maps would apply. Their application should be tied to on the ground conditions in any given year rather than a static calendar date. The team decided that the winter recreation map apply when there is an adequate depth of snow is present on the ground to protect vegetative resources. When there is an inadequate depth of snow present, summer ROS maps as well as travel management plans apply and snowmobile use would not be permitted off of designated routes.

Mapping Existing Condition

After compiling and mapping baseline information, District personnel reviewed the existing condition maps for correctness and consistency. After district review, Four Winter Recreation Classes were created and mapped as follows:

1) **Wilderness**—Areas designated as wilderness. Snowmobiling, Heli-skiing, or other motorized use is not allowed all year round.

2) **Non-Motorized** – These areas emphasize non-motorized winter recreation such as cross-country skiing, snowshoeing, tubing, etc. No snowmobiles or other motorized uses are allowed.

3) **Motorized** – Snowmobiling or other motorized travel is permitted in these areas and/or on designated routes. Non-motorized uses are also permitted here.

4) **Heliski** – These areas are designated for heli-skiing (helicopter supported backcountry skiing). Generally, there is no snowmobiling allowed in these areas unless otherwise noted. Other non-motorized uses are permitted.

Mapping of Alternatives

Using the Existing Condition map as a starting point, winter recreation maps for each alternative were developed. Each represented the general direction or theme of an alternative and are described as follows:

Alternative 1

No snowmobiles are allowed in inventoried roadless, wilderness, or recommended wilderness areas. No Heli-skiing allowed. No new ski areas or ski area expansion.

Alternative 2

Snowmobiling allowed in inventoried roadless areas only on designated routes. Open area snowmobiling is limited. No snowmobiling in Wilderness (1.1-1.4), proposed Wilderness (1.5), or in roadless areas adjacent to MPC 1.0's. No Heli-skiing allowed. No new ski areas or ski area expansion.

Alternative 3

Increase winter motorized access where at all possible. No new ski areas will be developed and no ski area expansion allowed. No snowmobiling in Wilderness (1.1-1.4) and recommended Wilderness (1.5). Heli-skiing permit boundary is altered—Gobbler's Knob closed to heliskiing. Some of Big Cottonwood Canyon opened to heli-skiing.

Alternative 4 - 1985 Forest Plan ROS

From Map 5 of the 1985 Forest Plan, a winter recreation map was created that displayed winter motorized and nonmotorized areas. Outside of wilderness, winter motorized was allowed across the forest except in the areas specifically mapped as semiprimitive nonmotorized. Since this map had not been updated to include lands acquired since 1985, these newly acquired lands were designated according to the existing condition map.

Alternative 5

Expands winter motorized access and use. Heli-skiing allowed as in existing special use permit.

Alternative 6

Expands winter motorized access and use in Cache/Box Elder Management area, reduces motorized access in the Lakes area of the Western Uintas and also in the Eastern Uintas. All other Management Areas are roughly the same as the existing condition.

Alternative 7

Addresses the winter recreation use conflicts and access management by providing for winter motorized use consistent with growing demand, while identifying selected areas for separation of non-motorized winter opportunities. Existing condition motorized areas remain motorized in MPC 1.5. Wilderness MPC 1.1-3 remains non-motorized. Acknowledges key big game winter range and implements some closures but primarily puts in place future monitoring.

From public comment, an analysis was conducted to determine criteria for deciding what was suitable for motorized and non-motorized use based on slope, aspect and vegetation type or condition. The conclusion of the analysis found that both motorized and non-motorized users were looking for the same terrain, aspect and vegetation types. Basically all areas on the Forest were being used at sometime during the snow-on season.

Information and understanding of snow and weather conditions for safety was of importance for both non-motorized and motorized groups.

- Limitations for motorized group: none.
- Limitations for non-motorized group:
    - Distance from drop point for a safe day trip is 6 miles or less.
    - Snow consistency (from powder to compacted). Compaction is considered a hazard because of high potential to cause a fall.
    - Noise
    - Air Pollution

APPENDIX B - 7

Scenery Management System Application

Introduction

This document describes how the framework of the Scenery Management System (SMS)(USDA Forest Service. 1995b) was applied in the development of alternatives in the Revised Forest Plan process for the Wasatch-Cache National Forest. The purpose of scenery management is to provide a tool to integrate the benefits, values, desires, and preferences regarding aesthetics and scenery into all levels of land management planning. The Scenery Management System is composed of 4 basic steps: 1- Inventory, 2 – Design, Analysis & Planning, 3 – Implementation and 4 – Monitoring. Each step becomes more detailed as you move through the various scales of planning from regional to project level. The Forest Plan scale provides broad program level direction for management. It is at this scale that the Scenery Management System framework was applied on the Wasatch-Cache National Forest.

Inventory of Existing Condition

A broad scale inventory was conducted of the Forest that consisted of existing use and management on the Forest to create a baseline from which to measure scenic integrity. The Forest was divided into five Landscape Character Themes (LCTs) that gave a broad image of the valued landscapes found on the Wasatch-Cache National Forest. The descriptions of those five themes are as follows:

1. **Natural Evolving LCT**
   The existing landscape originates primarily from natural disturbances and succession of plants, with subtle changes due to indirect human activities. The existing landscape character generally continues to change gradually over time through natural processes.

2. **Natural Appearing LCT**
   The existing landscape character has been influenced by both direct and indirect human activities, but appears natural to the majority of viewers. Natural elements such as native trees, shrubs, grasses, forbs, rock outcrops and streams or lakes dominate the views. While there is evidence of human influence from historic use, campgrounds, small organization camps, rustic structures and management activity, undeveloped campsites etc. these alterations are subordinate and are valued amenities within the landscape.

3. **Developed Natural Appearing LCT**
   This landscape character theme is characteristic of National, National Forest and State scenic byways with minor summer residential development, and developed recreation facilities and concentrated use areas within the foreground of the viewshed (1/2 mile). In these areas, the roadway, recreation amenities, and development harmonize and are subordinate with the landscape. For users, this built environment is part of the valued

natural appearing landscape. Users of these amenities are attracted to the natural appearing landscape, but desire a moderate to easy interaction with the landscape through the use of these amenities.

4. **Resort Natural Setting LCT**
   This landscape character theme is characteristic of developed recreation facilities such as ski resorts, and recreation resort communities. In these areas recreation amenities that harmonize with the natural landscape are one of the attractions for people. Facilities are designed and constructed to harmonize with the natural setting. While the facilities in the base areas are dominant in scale or form, that dominance declines as it transitions onto the mountainsides up to the ridgelines. Likewise, recreational opportunities provided in base areas rely more heavily on architecturally thematic constructed facilities, while those higher on the mountain become increasingly oriented toward the natural setting.

5. **Water Recreation Rural Appearing**
   This theme is characteristic of Pineview Reservoir recreation complex. The scenic qualities of Ogden Valley attract visitors and maintaining rural character is important to many landowners in this area. In this area, recreation amenities such as boat ramps, beaches, campgrounds, and boat docks are the main attraction for people. The surrounding cultural setting of farms, fields, and pastures influence development on the private lands for housing, businesses, roads and other developments.

The Forest was divided into seven Management Areas that were defined by sociological and biological criteria. Existing landscape character descriptions were created for each of the Management Areas that described the physical, biological and cultural/social character of the area. These descriptions paint a general picture of the Management Area (See Management Area descriptions chapter 3 introduction).

Mapping Alternatives

The SMS process was applied to all alternatives except for Alternative 4 with some adjustments made for local application of the system. Alternative 4 is the 1985 Plan as amended and was interpreted using SMS terms. The process used for mapping Alternative 4 is described in Appendix D.

The management prescriptions describe general management or use of the land. Mapping management prescriptions was one of the primary tools used to display the difference between alternatives. Based on management prescriptions and consistent with themes used in the baseline inventory, the following Landscape Character Themes (LCT) were used:

- Natural Evolving
- Natural Appearing
- Develop Natural Appearing
- Resort Natural Setting
- Water Recreation Rural Appearing.

The general application is as follows: "Wilderness" or "Recommended Wilderness" defined "Natural Evolving" recognizes the direction given for the lands managed as Wilderness. Other considerations used were the amount of cultural modification within a landscape. Landscapes such as Ski Resorts "Resort Natural Setting" water recreation areas like Pineview Reservoir and, "Water Recreation Rural Setting" are landscapes that have been modified to provide amenities for people to use. Scenic Byways fall under "Developed Natural Appearing" because of the high development densities along the byway. The LCT used for the remaining National Forest System Lands is "Natural Appearing". A tabular presentation of the conversion of MPCs to LCTs is provided in Appendix D.

From the management described in the management prescription, a Scenic Integrity Objective (SIO) was assigned based on the following:

1. Duration of effect a specific management would have on the landscape character within a specific LCT description. Five years plus duration where the image of the landscape appears changed.
2. Dominance of effect a specific management would have on the landscape character with a specific LCT description. (geometry, size, shape, pattern, form etc.).
3. What would be accepted as part of the apparent landscape character of a LCT. Considered cultural and biological elements.

The SIO was applied to each MPC. A table for converting MPC to LCT to SIOs is presented in Appendix D along with detailed descriptions of LCT and SIO and accepted cultural modifications.

From the above criteria, Forest "Landscape Character Themes" (LCT) and "Scenic Integrity Objectives" (SIO) were mapped. See "FEIS for Wasatch-Cache Forest Plan Revision Alternative - SMS" maps, map packet.

Alternative 4 SMS Process application

This Alternative represents the 1985 Forest Plan direction, which used Visual Quality Objectives (VQO) as developed under the Visual Management System. In 1995 the Forest Service replaced the Visual Management System (VMS) with the Scenery Management System. A cross walk for terminology and component changes from the Visual Management System to SMS is provided in Appendix D, under the heading Landscape Character Definition Table for "Natural" 1985 Forest Plan Theme.

APPENDIX B – 8

Vegetation Cover Type Map

Introduction

GIS personnel from the Intermountain Region of the USDA Forest Service, Regional Office (RO) developed the original map of the plant communities of the Wasatch-Cache National Forest in 1995. The Forest was divided into 11 zones, based on geologic features, vegetation, and elevation ranges. These zones closely match the ecological subsections that were later developed for this portion of the Intermountain Region of the Forest Service. These included:

1. Cache Front
2. Ant Flats
3. Monte Cristo/Curtis Creek/Sinks
4. Causey Conglomerates
5. North Wasatch Front
6. South Wasatch Front
7. Wasatch Hinterlands
8. Chalk/Weber
9. West Flank (Uinta Mountains)
10. North Slope Outwash (Uinta Mountains)
11. North Slope Glaciation (Uinta Mountains)

Originally there were 75 spectral classes, derived from satellite data using the Terra Mar Image Analysis System. These types were then grouped into similar vegetation classes using satellite imagery and knowledge of existing vegegetation by RO personnel, by ocular comparisons. The RO ten step process for the vegetation classification process is described below (see RO PROCESS: DESCRIPTION OF WASATCH-CACHE VEGETATION ATTRIBUTES). The classification included both forest and non-forest vegetation types. The forested type size class information was determined by overlaying stand examination data over the forested vegetation types provided from the satellite classification. The size class was then added to these polygons with the use of GIS technology, to produce maps of the existing vegetation on the forest.

A classification of the plant communities was done using satellite imagery and knowledge of Regional Office personnel of the existing conditions on the ground. Forest Inventory maps from 1974 of available/capable timberlands were used to populate data associated with timber stands (size class and canopy closure). Very little other site data was used in this classification. District personnel involved with forest or rangeland vegetation as part of their job began evaluating and making modifications to this map. The forest ecologists then began an evaluation of these vegetation maps in 1999 and using, field observations, knowledge of the forest, and digital orthophotos, made some additional adjustments to the vegetation map.

Along the Wasatch Mountains, it was found that the original vegetation cover type map often failed to distinguish Gambel oak communities from aspen communities. In the Stansbury Mountains it did a poor job of delineating mahogany stands, over estimated the occurrence of tall shrub communities, and under estimated the occurrence of spruce-fir and limber pine stands. In the Uinta Mountains, riparian communities (including willow, wet meadow, and bottomland hardwood communities) were under estimated, and all conifer-dominated communities were originally delineated as lodgepole or spruce-fir. No mixed conifer communities were classified.

Forest-wide, no differences were noted in sagebrush dominance. The forest has significant acres of mountain big sagebrush, spiked big sagebrush, low sagebrush, with moderate amounts of Vasey big sagebrush (primarily occurring in the Bear River Range near the Idaho border), silver sagebrush (uncommon except in some portions of the Uinta Moutains adjacent to and in riparian areas and as a minor component in the North Sinks area in the Bear River Range). Sagebrush as well as grassland communities were originally mapped, but these were later combined into as single sagebrush cover type because there were no real similarities between the mapped distribution and actual occurrences of these types on the ground. Originally, tall forb communities were not classified. This type was later mapped using knowledge of where these communities are known to occur.

Some problems still occur with the existing vegetation map of the forest. Additional work needs to be done on all the noted deficiencies with the existing vegetation map.

RO Process - Description of Wasatch-Cache Vegetation Attributes

This document describes the vegetation classification attribute process of Wasatch-Cache National Forest vegetation data done by the Intermountain Region Forest Service, Regional Office.

Processing Steps from Terra Mar to ARC/Info:

Step One: GEO-Reference Landsat image using ERDAS image processor and create ARC/Info GRID (rastar model) format.

Step Two: Reclassify original 75 class GRID into the new classes Identified by District Forester during work on Terra Mar

Step Three: Use GRID processing capabilities to take data from 30 meter resolution to 5 acres (a combination of regiongroup, select and nibble commands from the GRID module).

Step Four: Produce polygons from the GRID data.

Step Five: Produce hard copy maps at 1:24,000 of Conifer stands with unique identifiers for reclassification to specific conifer type based on Wasatch-Cache timber RAM maps.

Step Six: Data files with the unique identifier and the new type for the conifer files was then transfered to the TYPE attribute in the ARC/Info polygon file via an AML written in the Region 4 GIS Lab. Tracking procedures were written into the AML to allow checking of the data submitted for correctness. Errors were identified during the data transfer process and corrected by GIS personnel and District Forester.

Step Seven: Ponderosa Pine stands and regeneration cuts were identified through a union with stand polygons obtained by the Regional GIS personnel from the W-C supervisors office GIS personnel.

Step Eight: Quad size 1:24,000 hard copy maps were produced with all types for review by forest personnel

Step Nine: Areas of confusion of Oak/maple types and Aspen types along the Wasatch front were identified and a simple rule base applied to correct oak/maple types to Aspen and Conifer/Shrub types to Aspen The following steps were used in ARC/Info to identify oak/maple and conifer/shrub types to be changed to Aspen type:

1. General Aspect and Elevation rules were identified by District Forester.
2. Aspect and elevation polygons were created in ARC/Info's GRID module and vectorized.
3. Aspect and elevation polygons were unioned together and then unioned with the vegetation layer.
4. Arc/Info queries were performed in INFO for the rulesand selected polygons were retyped to ASPEN.

GENERAL RULES USED:

In TYPES originally designated OAK/MAPLE

Northeastern Slopes above 8,000 feet changed to ASPEN
All other slopes above 8,500 feet changed to ASPEN

In TYPES originally designated CONIFER/ASPEN

Northereastern Slopes above 7,500 changed to ASPEN.
All other slopes above 8,500 changed to ASPEN.

Step Ten: Supervisors office GIS Personnel split coverages into quads.

APPENDIX B - 9

RANGE CAPABILITY AND SUITABILITY

Using the Intermountain Region Protocol, Rangeland Capability and Suitability Determinations for Forest Plan Revisions (USDA Forest Service, 1998b), capability and suitability analyses were completed. The capability analysis focuses on the ability of the land to support livestock grazing, while the suitability focuses on the appropriateness of livestock grazing on these lands.

Criteria Used in Determination of Capable Rangeland Acres

The capability analysis identified areas with the physical characteristics conducive to livestock grazing. Capable Forest rangelands were considered to have the following characteristics:

- Capable of producing at least 200 pounds of forage per acre on an annual basis.
- Having a dominant land slope gradient of less than 30 percent (sheep or cattle).
- Having a dominant land slope gradient of less than 45 percent (sheep only).
- Being within 1 mile of a surface water source.

The methodology employed involved manipulation of various data layers within the Forest corporate GIS database. Data from the following GIS layers were used in this analysis:

- Digital Elevation Model (DEM) layer
- Cartographic Features File (CFF) for surface water features
- Forest vegetation layer

The DEM layer was used to determine slope breaks on the landscapes (0-30 percent for sheep and cattle, 31-45 percent for sheep only, and greater than 45 percent, which is generally not used by any class of livestock). The CFF file was used to determine distance to surface water. During the analysis, it became clear that the CFF layer did not contain all surface water sources known to exist on the North Slope of the Uinta Mountains (many potholes), which resulted in the model understating capable range for that area. We therefore elected to drop the surface water source proximity criteria for modeling capable range in this area. Because the CFF was more accurate for all other areas, that criteria was retained for modeling capable range on the remainder of the forest. The vegetation layer was used as a surrogate for minimum forage production. In general, coniferous-forested vegetation types (spruce, fir, pine, Douglas-fir), oak, and barren areas were said to not produce the minimum 200 lbs/acre of forage. All other types were included as potential forage-producing types. While it is possible that some areas included in those types identified as not being able to produce 200 lbs/acre do produce that much, other acres noted as being able to produce that amount, do not (for example, low sagebrush rarely produces 200 lbs/acre).

Criteria Used in Determination of Suitable Rangeland Acres

Using the Intermountain Region Protocol, Rangeland Capability and Suitability Determinations for Forest Plan Revisions (USDA Forest Service, 1998b), criteria were reviewed and tailored to local conditions for a suitability assessment. This section discusses the criteria used in the determination of rangeland suitable acres for each of the seven alternatives.

A review of the definitions and suggested considerations contained in the Regional Protocol was completed. Each Ranger District was assessed for how suitability might vary by alternative, given the intent of each alternative. Criteria suggested in the protocol were evaluated in conjunction with a review of local knowledge, data from monitoring, previous analyses of rangeland management such as Allotment Management planning, and discussions with each District Range Conservationist about potential suitability considerations that might be varied by alternative. In some cases, while a criterion seemed relevant, it was determined that there was not sufficient data to apply to analysis needed to support suitability differences by alternative. An example of this was the protocol criterion "noxious weed infestations where forage is not used by livestock or use would contribute to increase of the infestation." A review of each District's information regarding noxious weed infestations did not yield a direct relationship to livestock grazing in particular and thus it was agreed that this criterion would not be useful in our analysis.

After considerable discussion and review of available data, analyses, and approaches to suitability, it was agreed that all capable rangelands within existing open allotments would be considered to be suitable *except* where the following conditions exist and these would be applied based on the nature of the alternative to blend with other aspects of the management direction there. Table B9-1 shows the outcome of applying the following factors in the determination of rangeland suitability by alternative.

- **Incompatible Uses:** Presence of developed recreation sites and research natural areas (RNA's). No proposed or existing RNA's (including Red Butte, Mollens Hollow, and Morris Creek) have acres within any allotments.

- **Upland Range Conditions:** Presence of upland rangelands in unsatisfactory condition (those not meeting or moving toward Forest Plan objectives). The EIS interdisciplinary team determined that for Alternatives 1, 2, and 6 these areas should not be part of the suitable rangeland base for the forest. For Alternative 7, these acres remain suitable, but are grazed at 30-40 percent, rather than 50 percent.

- **Riparian Range Conditions:** Presence of riparian rangelands in unsatisfactory condition (those not meeting or moving toward Forest Plan objectives). The EIS interdisciplinary team determined that for Alternatives 1, 2, 3, and 6 these areas should not be a part of the suitable rangeland base for the forest. As with the upland areas in unsatisfactory condition, for Alternative 7, these acres remain suitable, but are grazed at 30-40 percent, rather than 50 percent.

- **Vacant Allotments**- There are 12 allotments within the Forest that are currently vacant (i.e. there are no current Term Grazing Permits for these allotments). The EIS interdisciplinary team determined that for Alternatives 1 and 2 all vacant allotments would be closed and capable acres within them removed from the suitable rangeland base for the forest. The team determined that for Alternatives 6 only the three vacant sheep allotments in the Uinta Mountains (Burro, Thompson, and West Beaver) would be closed for bighorn sheep habitat and their capable acres removed from the suitable base. Alternative 7 closes these three vacant allotments as well as five allotments (Clegg, Hardscrabble, Mill Canyon, Shingle Mill and Wright) in the Davis and Salt Lake County watersheds. Alternatives 3, 4, and 5 close no vacant allotments.

- **Cutthroat Trout Habitat Needs**- For Alternative 2 only, portions of 6th order HUCs (watersheds) within allotments that have known populations of Bonneville or Colorado cutthroat trout, and that have 20 acres or more of riparian areas reported in the INFRA database as not meeting or moving toward Forest Plan objectives (unsatisfactory condition), were removed from the suitable acres. These acres are within the following Allotments: Logan Canyon, Middle Fork, Black Fork Cattle, North Rich, Gilbert Creek, Black Fork Stock Driveway, East Fork Smiths Fork, Poison Mountain, Walker, West Fork Smiths Fork, Woodruff, and Three Mile.

One of the documented conflicts with livestock use on the Forest is from backcountry recreation users, often in designated Wilderness Areas. This has lead to suggestions that Wilderness areas be considered as not suitable for livestock grazing. Section 303 of the Utah Wilderness Act of 1984 noted that recreation conflicts alone would not be the determining factor in the removal of livestock from those newly established Wilderness Areas, however, resource conditions could be cause for reductions in livestock numbers. Wilderness status was therefore not deemed appropriate as a criterion for rangeland suitability.

Table B9-1. Analysis used for determining rangeland suitability by alternative.

Criteria	Alt1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Forest Capable Acres	369,900	369,900	369,900	369,900	369,900	369,900	369,900
Capable Acres Within Currently Open (Active and Vacant) Allotments	302,700	302,700	302,700	302,700	302,700	302,700	302,700
Developed Rec. Sites Within Currently Open Allotments [1]	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700
Capable Acres Within Currently Open Allotments	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Capable Acres Removed within Vacant Allotments Closed for Maintaining Resource Conditions [2]	-10,392	-10,392	0	0	0	0	-2,453
Capable Acres Removed within Vacant Allotments Closed For Bighorn Sheep [3]	-7,760	-7,760	0	0	0	-7,760	-7,760
Uplands Acres Removed- Not Meeting FP Objectives [4]	-16,200	-16,200	0	0	0	-16,200	0
Riparian Acres Removed- Not Meeting FP Objectives [4]	-2,100	-2,100	-2,100	0	0	-2,100	0
Acres Removed for Cutthroat Trout Management [5]	0	-26,000	0	0	0	0	0
Total Suitable Acres	263,548	237,548	297,900	300,000	300,000	273,940	289,787
Percent of Capable Within Currently Open Allotments (302,700 acres)	87.8%	79.2%	99.3%	100.0%	100.0%	91.3%	96.6%

[1] Information from Forest Corporate GIS database.
[2] Alternatives 1 and 2 close all vacant allotments and Alternative 7 closes those vacant allotments (Clegg, Hardscrabble, Mill Canyon, Shingle Mill and Wright) within the Salt Lake and Davis County watersheds for watershed condition maintenance.
[3] Vacant allotments (Burro Peaks, Thompson Peak, and West Beaver) closed for bighorn sheep health purposes. This would reduce suitable acres by 7,800 acres.
[4] Information extrapolated from monitored areas (INFRA database) and applied forest-wide.
[5] Entire watershed acres removed within allotments with both known cutthroat trout populations and reported riparian acres in unsatisfactory condition.

Potential <u>Future</u> Changes in Suitable Acres - In addition to the closure of vacant allotments in the Eastern Uintas Management Area (Burro Peaks, Thompson Peak, and West Beaver) for bighorn sheep habitat, Alternatives 1, 2, and 6 allow for the future closure of Gilbert Peak, Henry's Fork-Hessie Lake, & Red Castle Allotments should those permits be <u>voluntarily</u> waived without preference. This would reduce suitable acres by 9,500 acres. Alternative 7 allows for these, as well as East Fork Blacks Fork, West Fork Blacks Fork, East Fork Bear River, and Stillwater allotments to be closed if permits are <u>voluntarily</u> waived without preference. This would reduce suitable acres by 9,800 acres (for a total of 19,300 acres) with the associated benefit being reduced risk for disease transmission from domestic sheep to bighorn sheep as well as watershed protection and establishment of ungrazed benchmarks. Given that these Allotment closures would be based strictly on voluntary actions by permit holders, net effects on permittee

operations would be expected to be positive. (Otherwise permittees could choose not to take this action). These wildlife and ungrazed resource condition values are foregone in Alternatives 3, 4, and 5.

Calculations of Projected AUMs

Projected outputs in Animal Unit Months were calculated using factors that would yield the most realistic possible results. Data on actual use for the 10-year period 1991 to 1999 (Table B9-3) shows that there can be quite a range of outputs from grazing in the Wasatch-Cache National Forest. Permitted numbers have been consistently higher than actual use but also have varied significantly over the same time period.

Table B9-3. Average AUMs for the period of 1990 to 1999, based on actual use

Year	Sheep AUMs		Cattle AUM's		Total AUMs		Difference		Percent Authorized vs. Permitted	
	Permitted	Authorized	Permitted	Authorized	Permitted	Authorized	Sheep	Cattle	Sheep	Cattle
1990	32,965	29,139	44,785	39,165	77,750	68,304	3,826	5,620	88%	87%
1991	34,118	30,754	46,357	34,366	80,475	65,120	3,364	11,991	90%	74%
1992	31,277	24,341	45,136	37,254	76,413	61,595	6,936	7,882	78%	83%
1993	36,762	24,501	42,759	36,989	79,521	61,490	12,261	5,770	67%	87%
1994	34,389	26,828	44,013	32,874	78,402	59,702	7,561	11,139	78%	75%
1995	31,615	21,579	39,798	33,393	71,413	54,972	10,036	6,405	68%	84%
1996	17,321	14,348	27,146	15,850	44,467	30,198	2,973	11,296	83%	58%
1997	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
1998	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
1999	29,555	24,879	41,692	37,774	71,247	62,653	4,676	3,918	85%	91%
10 year maximum	36,762	30,754	46,357	39,165	83,119	69,919	12,261	11,991	90%	91%
10 year minimum	17,321	14,348	27,146	15,850	44,467	30,198	2,973	3,918	67%	58%
10 year average	30,711	24,613	41,507	34,321	72,218	58,934	6,098	7,186	80%	82%

Given this, we decided to use the 10-year average of AUMs along with the suitable acres actually grazed during that period as a baseline. To identify suitable acres for these calculations we started with total capable acres within open allotments and subtracted developed recreation site acres and vacant allotment acres because neither of these produced grazing outputs. This left a total of 281,848 suitable acres. The 281,848 suitable acres divided by the 10-year average of 58,934 AUMs provided an average “suitable acres per AUM” of 4.78. If each AUM produced requires an average of 4.78 acres, then the number of suitable acres that would be grazed in each alternative divided by this number would yield projected outputs by alternative. The forage utilization allowance assumption was 50% as adopted from the 1998 Rangeland Health Amendment.

Table B9-2 shows suitable acre calculations used to determine projected outputs (AUMs) by alternative. Vacant allotments have not been stocked and are not expected to be stocked within the planning period, so they have had no effect on actual outputs.

Table B9-2. Suitable rangeland acres used for determination of AUMs by alternative

Criteria	Alt1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Forest Capable Acres[1]	369,900	369,900	369,900	369,900	369,900	369,900	369,900
Capable Acres Within Currently Open (Active and Vacant) Allotments[1]	302,700	302,700	302,700	302,700	302,700	302,700	302,700
Developed Rec. Sites within Currently Open Allotments[1]	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700	-2,700
Remaining Capable Acres Within Currently Open Allotments	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Vacant Allotments[1]	-18,152	-18,152	-18,152	-18,152	-18,152	-18,152	-18,152
Upland Acres Removed for Not Meeting Forest Plan Direction[2]	-16,200	-16,200	0	0	0	-16,200	0
Riparian Acres Removed for Not Meeting FP Objectives[2]	-2,100	-2,100	-2,100	0	0	-2,100	0
Acres Removed for Cutthroat Trout Management[3]	0	-26,000	0	0	0	0	0
Total Suitable Acres	263,548	237,548	279,748	281,848	281,848	263,548	281,848

[1]Information from Forest Corporate GIS database
[2]Information from monitored areas (INFRA database) and extrapolated forest wide
[3]Entire watershed acres removed within existing allotments that have both known cutthroat trout populations and reported acres of riparian areas (estimated or verified) as not meeting forest plan objectives (desired conditions)

.**For Alternatives 1-6**, the determination of projected AUMs (Table B9-4) was based on dividing the suitable acres for each alternative by 4.78 acres/AUM.

For Alternative 7, acres of riparian and upland rangelands in unsatisfactory condition were given a lower output projection (i.e. more acres necessary to produce 1 AUM) because these areas have a lower forage utilization allowance in this Alternative. In all other Alternatives, the utilization allowance is 50% on suitable lands. In Alternative 7 the forage utilization allowance is 30-40% for those areas in unsatisfactory condition (16,200 acres of upland and 2,100 acres of riparian) and 50% for areas in satisfactory condition (263,548 acres). The average acres per AUM is 6.72 . Outputs for this alternative were based on dividing each of the acreages (263,548 acres of satisfactory and 16,200 acres of unsatisfactory) by the appropriate acres per AUM (4.78 for satisfactory and 6.72 for unsatisfactory). Given these acres, a total of 57,867 AUMs are estimated under this alternative (263,548 acres divided by 4.78 acres/AUM, plus 18,300 acres divided by 6.70 acres/AUM on unsatisfactory rangelands). Forest-wide, cattle are 58 percent of total AUMs, and sheep are 42 percent of total AUMs

It is recognized that vacant allotments have forage that could potentially increase projected AUMs. However, recent budget trends do not allow the Forest Service to administer and plan

for proper grazing use of currently active allotments. Therefore the probability of conducting the site-specific environmental analysis necessary to reintroduce livestock grazing to vacant allotments within the planning period is so low that we felt it would be misleading to include increases in AUMs based on the stocking of vacant allotments.

Table B9-4. Projected outputs (AUMs) by alternative. Alternatives 1-6 are based on 50 percent use on suitable rangelands. Alternative 7 is based on 30 percent use on unsatisfactory condition rangelands and 50 percent use on satisfactory condition rangelands.

Livestock	10-Year Average AUMs [1]	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 [2]
Suitable acres	281,848	263,548	237,548	279,748	281,848	281,848	263,548	281,848
Satisfactory Condition								263,548
Unsatisfactory Condition [3]								18,300
Total Average AUMs		55,136	49,696	58,525	58,934	58,934	55,136	57,859
Cattle AUMs	34,300	31,979	28,824	33,944	34,182	34,182	31,979	33,563
Sheep AUMs	24,600	23,157	20,872	24,580	24,752	24,752	23,157	24,304
Total AUMs	58,900	55,136	49,696	58,525	58,934	58,934	55,136	57,867

[1]Average Authorized AUMS
[2]For Alternative 7, 4.78 acres/AUM on satisfactory range, 6.70 acres/AUM on unsatisfactory range
[3]Unsatisfactory condition rangelands extrapolated from areas of the forest where those data have been estimated or verified and applied forest wide

For Alternatives that provide for closure of sheep allotments currently actively grazed (as opposed to the Three vacant Allotments with bighorn sheep habitat-Burro Peaks, Thompson Peak, and West Beaver) on the North Slope Uinta Mountains (in the event of voluntary waiver of permits without preference), the capable acres within those allotments (Gilbert Peak, Henry's Fork-Hessie Lake, and Red Castle for Alternative 6 and these plus East Fork Blacks Fork, West Fork Blacks Fork, Stillwater, and East Fork Bear River for alternative 7) were assumed to continue to provide outputs given the uncertainty of future voluntary waivers.

Source of Data:

Capable acres were determined from the Forest corporate GIS database and included percent slope determined by the digital elevation model, as well as the vegetation and hydrology GIS layers. Ten years of data (1990 – 1999) from the RAMIS database were used to determine the 10-year maximum, 10-year minimum, and 10-year mean AUMs permitted and authorized. From these, the AUMs by alternative were determined.

Ten years of permitted and authorized AUM data (1990–1999) is from the RAMIS database, which were used to determine the 10-year maximum, 10-year minimum, and 10-year averages. From these, the AUMs by alternative were determined.

Economic Suitability Analysis

The following analysis meets the requirements for an economic suitability analysis for livestock grazing on the Forest. It gives additional information to the deciding official regarding allocation of lands to livestock grazing management. The AUMs and suitable acres used in the economic analysis are from those determined for each alternative in Table B9-4 above.

Table B9-5 shows the Forest Service component of the economic efficiency information for each alternative. Revenues to the Forest Service in 2002 were $1.43 per head-month of cattle and $0.29 per head-month of sheep. The revenues per acre, therefore, are the revenues/AUM multiplied by the number of AUMs, divided by the number of suitable acres by alternative. These revenues are between $0.28 and $0.30 per acre. The Forest Service budget expenditures were determined for each alternative using the Forest Economic Analysis Spreadsheet Tool (FEAST) and from this, the costs to the Forest Service per suitable acre by alternative were determined. These values ranged from $1.27 to $1.43. Range revenues to the Forest Service, based on revenues per head-month, ranged from $51,396 to $60,953 and net benefits per acre range from –$ 1.06 to –$1.21.

Table B9-6 shows the Permittee component of the economic efficiency information for each alternative. In this portion of the analysis, example costs to permittee (sheep and cattle) are estimated based on an example provided by the Rio Grande National Forest in Colorado. While these costs will vary from area to area, and from permittee to permittee, they are used as a means to assess potential total costs per AUM (Forest Service costs plus permittee costs). Because these costs are fixed they do not vary by alternative. Costs to manage sheep are greater than for cattle because of the costs associated with hiring herders. In addition to wages, these include workman's compensation, health insurance, food and supplies, dog food, etc. In the examples provided below, total costs per AUM were $16.81 for sheep and $11.49 cattle.

Note: Appeal decision for the Rio Grande National Forest in Colorado (USDA Forest Service 2001e). In this Decision on the topic of Livestock Grazing Capability And Suitability Determination, the Forest Service Chief stated "I do not… agree with appellant's contention that if the suitability determination reveals that non-grazing values outweigh grazing values, the area should in all instances be deemed unsuitable for livestock grazing."

Table B9-5. Summary of the FS Component of the Economic Analysis for Livestock Grazing

Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
AUMs-Cattle	31,980	28,820	33,940	34,180	34,180	31,980	33,560
AUMs-Sheep	23,160	20,870	24,580	24,750	24,750	23,160	24,300
AUMs Total	55,140	49,690	58,520	58,930	58,930	55,140	57,860
Head-Months – Cattle	24,227	21,833	25,712	25,894	25,894	24,227	25,424
Head-Months – Sheep	77,200	69,567	81,933	82,500	82,500	77,200	81,000
Head-Months – Total	101,427	91,400	107,645	108,394	108,394	101,427	106,424
Suitable Acres in Active Cattle Allotments (55% of total)	144,951	130,651	153,861	155,016	155,016	144,951	155,016
Suitable Acres in Active Sheep Allotments (45% of total)	118,597	106,897	125,887	126,832	126,832	118,597	126,832
Total Suitable Acres in Active Allotments	263,548	237,548	279,748	281,848	281,848	273,900	281,848
Acres/Head-Month – Cattle	5.98	5.98	5.98	5.99	5.99	5.98	6.10
Acres/Head-Month – Sheep	1.54	1.54	1.54	1.54	1.54	1.54	1.57
Acres/Head-Month – Total	2.60	2.60	2.60	2.60	2.60	2.60	2.65
Head-Months/Suitable Acre Cattle	0.17	0.17	0.17	0.17	0.17	0.17	0.16
Head-Months/Suitable Acre Sheep	0.65	0.65	0.65	0.65	0.65	0.65	0.64
Total Head-Months/ Total Suitable Acre	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Acres per Total AUM (Sheep + Cattle) [1]	4.8	4.8	4.8	4.8	4.8	4.8	4.8 (sat) 6.7(unsat)
AUMs/Suitable Acre	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Forest Service Revenues and Costs							
Revenue/Head-Month - Cattle (2002 fees/Head-Month)	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43	$ 1.43
Revenues/Head-Month - Sheep	$ 0.29	$ 0.29	$ 0.29	$ 0.29	$ 0.29	$ 0.29	$ 0.29
Revenues/Acre - Cattle	$ 0.131	$ 0.131	$ 0.131	$ 0.131	$ 0.131	$ 0.131	$ 0.129
Revenues/Acre - Sheep	$ 0.085	$ 0.085	$ 0.085	$ 0.085	$ 0.085	$ 0.085	$ 0.083
Cattle + Sheep Head-Month Revenues/Acre	$ 0.216	$ 0.216	$ 0.216	$ 0.216	$ 0.216	$ 0.216	$ 0.212
FS Budget Expenditures (dollars) by the Range Program: [4]	$340,000	$340,000	$391,000	$378,000	$391,000	$359,000	$359,000
Forest Service Costs/Acre [5]	$1.29	$1.43	$1.40	$1.34	$1.39	$1.36	$1.27
Range Revenues – Cattle	$34,645	$31,222	$36,768	$37,028	$37,028	$34,645	$36,357
Range Revenues – Sheep	$22,388	$20,174	$23,761	$23,925	$23,925	$22,388	$23,490
Total Range Revenues [4]	$57,033	$51,396	$60,529	$60,953	$60,953	$57,033	$59,847
Net Revenues per Acre [6]	$0.22	$0.22	$0.22	$0.22	$0.22	$0.22	$0.21
Net Benefits per Acre [7]	- $1.07	- $1.21	- $1.18	- $1.12	- $1.17	- $1.15	- $1.06

[1] In Alternatives 1-6, which apply a 50 percent utilization rate on all rangelands, it was calculated that 4.8 acres are required to support an AUM. Alternative 7 applies this 50 percent utilization rate on satisfactory condition rangelands and a 30-40 % utilization rate on unsatisfactory condition rangelands. This results in 6.7 acres/AUM on unsatisfactory rangelands.

[2] Revenues/AUM = Fees collected in 2002 per head-month (sheep = $0.29; cattle = $1.43) converted to fees per AUM

[3] Revenues/Acre = Revenues/AUM multiplied by AUMs/Suitable Acres

[4] From FEAST (Forest Economic Analysis Spreadsheet Tool) used in economic analysis for forest plan (on file)

[5] Cost/Acre = FS Budget Expenditures by the Range Program divided by Acres Capable and Suitable

[6] Net Revenues/Acre = Range Revenues divided by Acres Capable and Suitable

[7] Net Benefits/Acre = Net Revenues/Acre minus Cost/Acre

Table B9-6. Summary of the Permittee Component of the Economic Analysis for Livestock Grazing[8]

Sheep: for 1000 head, example head-months = 3,000							
Measure	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Herder wages $700/ month	$ 2,100	$ 2,100	$ 2,100	$ 2,100	$ 2,100	$ 2,100	$ 2,100
Workman's comp	$ 192	$ 192	$ 192	$ 192	$ 192	$ 192	$ 192
Health insurance	$ 60	$ 60	$ 60	$ 60	$ 60	$ 60	$ 60
Food and supplies for camp	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900
Two horses	$ 315	$ 315	$ 315	$ 315	$ 315	$ 315	$ 315
Camp	$ 225	$ 225	$ 225	$ 225	$ 225	$ 225	$ 225
Horseshoeing	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150
Tack	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150
Dog food	$ 540	$ 540	$ 540	$ 540	$ 540	$ 540	$ 540
Camp Tender	$ 540	$ 540	$ 540	$ 540	$ 540	$ 540	$ 540
4 pack mules (divided by four herds)	$ 375	$ 375	$ 375	$ 375	$ 375	$ 375	$ 375
Pond maintenance	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400
Predator loss (3% of 1150 lambs @ $85)	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932
Stray loss (3% of 1150 @ $85)	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932	$ 2,932
Ewe stray loss (2% of 1000 ewes @ $120/ewe)	$ 2,400	$ 2,400	$ 2,400	$ 2,400	$ 2,400	$ 2,400	$ 2,400
Vehicles	$ 1,070	$ 1,070	$ 1,070	$ 1,070	$ 1,070	$ 1,070	$ 1,070
Total	$15,281	$15,281	$15,281	$15,281	$15,281	$15,281	$15,281
Per Head-Month in this example	$ 5.09	$ 5.09	$ 5.09	$ 5.09	$ 5.09	$ 5.09	$ 5.09
Cattle: for 1250 head, example AUMs = 4,377							
Permittees plus pool rider = 3 @ $2000/ month x 4 months	$24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000
Workman's comp (15%)	$ 3,600	$ 3,600	$ 3,600	$ 3,600	$ 3,600	$ 3,600	$ 3,600
6 horses x $2,500/10yr.	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
Salt/ mineral supplement (2 ton/month x $600/ton)	$ 4,800	$ 4,800	$ 4,800	$ 4,800	$ 4,800	$ 4,800	$ 4,800
Vehicle/ATV	$ 1,200	$ 1,200	$ 1,200	$ 1,200	$ 1,200	$ 1,200	$ 1,200
Range Improvement Maintenance							
Materials	$ 700	$ 700	$ 700	$ 700	$ 700	$ 700	$ 700
Labor (3 weeks = $ 1,500) In pool rider salary	$1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
Vet Bills	$1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
2% death loss @ $500/head (25 head)	$12,500	$ 12,500	$ 12,500	$ 12,500	$ 12,500	$ 12,500	$12,500
Total	$50,300	$50,300	$50,300	$50,300	$50,300	$50,300	$50,300
Per Head-Month in this example	$11.49	$ 11.49	$ 11.49	$ 11.49	$ 11.49	$ 11.49	$11.49

[8] Because AUMs are adjusted in direct proportion to suitable acres, the summary by alternative does not vary by alternative

Table B9-8 shows, by alternative, the costs per acre for permittees to graze cattle and sheep on the Forest. This illustrates a range from $2.12 to $2.16 for cattle and $3.44 to $3.51 for sheep. Table B9-8 illustrates that the total costs per acre (permittee plus Forest Service) to graze livestock on National Forest lands. These costs range from $8.10/acre in Alternative 7 to $8.52/acre in Alternative 2.

Table B9-7 Permittee Cost Per Acre for Grazing Cattle and Sheep by Alternative

Summary by Alternative – Cattle							
Permit	$ 0.24	$ 0.24	$ 0.24	$ 0.24	$ 0.24	$ 0.24	$ 0.23
Non-Permit	$ 1.92	$ 1.92	$ 1.92	$ 1.92	$ 1.92	$ 1.92	$ 1.88
Total	$ 2.16	$ 2.16	$ 2.16	$ 2.16	$ 2.16	$ 2.16	$ 2.12
Summary by Alternative – Sheep							
Permit	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19
Non-Permit	$ 3.32	$ 3.31	$ 3.32	$ 3.31	$ 3.31	$ 3.32	$ 3.35
Total	$ 3.50	$ 3.50	$ 3.51	$ 3.50	$ 3.50	$ 3.51	$ 3.44

Table B9-8. Total Cost (Forest Service & Permittee) Per Acre for Grazing Livestock by Alternative

Costs	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Cost/Acre – Cattle	$3.45	$3.59	$3.56	$3.50	$3.55	$3.52	$3.39
Total Cost/Acre – Sheep	$4.79	$4.93	$4.90	$4.84	$4.89	$4.87	$4.71
Total Costs/Acre	$8.24	$8.52	$8.46	$8.34	$8.44	$8.39	$8.10

Note: Permit Administration costs per allotment increase as numbers decrease because Congress fixes dollars allocated to administer permits and, in general, there are insufficient funds to manage all allotments to standard.

APPENDIX B - 10

Oil and Gas Leasing Analysis Assumption

Introduction

The Reasonably Foreseeable Development (RFD) scenario prepared in 1990 (USFS, 1994) is still a current representation of what level of activity could be reasonably anticipated based on the geology of the area. The one significant change since the completion of that report is the shift in demand and increased market for natural gas. The north slope is primarily an oil target with any gas being from production associated with oil so the increased demand for natural gas has not resulted in a need to change the RFD. New technology that allows for deeper wells to be drilled may expand the potential reserve models used to evaluate this area, but currently there is not enough known about the applicability of that technology to factor it into the RFD (Burkhardt, 2000.)

The RFD is an analytical tool not a ceiling or limit on activities. It provides the reasonably foreseeable projection that enables impacts analysis to occur. The number of wells projected could be exceeded or never realized but if monitoring indicates the level of impacts analyzed is being reached or exceeded, further evaluation would be conducted to determine if additional mitigation measures are necessary.

The 1990 Oil and Gas Potential Report (Kaldenbach, 1990) analysis concluded that during the 15-year period from 1991 through 2005 period, 11 exploration wells would be drilled in the Moxa Arch area with one or two exploration wells drilled in each of the other two areas. Because there are few, if any, roadless acres outside the wilderness along the Moxa Arch, it is reasonable to redefine the RFD for the roadless portion being addressed in the forest plan revision analysis. It is more likely to assume 7 exploration wells. Applying the unit's historical discovery ratio of one field discovery per 5.6 exploration wells drilled indicates that the seven projected exploration wells could discover one new field (Burkhardt, 2000.)

Exploration Activities

The North Slope Oil and Gas Leasing Environmental Impact Statement (USDA Forest Service 1994) estimated the number of acres of ground disturbance resulting from projected oil and gas exploration activities by extrapolating from past activities. This was shown in Appendix E of that document. Estimates were reviewed and still considered valid except for road reconstruction amounts. Because the area being analyzed is within the inventoried roadless area greater amounts of new road construction were estimated.

- Each exploratory well pad would require an average of four acres.
- Each exploratory well pad would require 1.7 mile of road construction.
- Each mile of road reconstruction would have a net disturbance of 2.4 acres per mile after cut-and-fill slope reclamation.

- Each mile of new road construction (relocation or new construction) would have a net disturbance of 3.6 acres per mile after cut-and-fill slope rehabilitation.

The total area of ground disturbance would average about 10 acres for each exploratory well.

Development Activities

The discovery of a single field as a result of an exploration well discovery would result in the following activities:

- "shooting" ten miles of seismic lines, which are composed of two lines laid out in a cross pattern
- one or two wildcat wells to discover a field or "condemn" an exploration target

The geologic, development, and production characteristics of a newly discovered filed would be similar to characteristics of fields in the Bridger Lake-Luckey Ditch producing trend. Fields in that area produce both oil and gas from mainly Dakota sandstone. Important characteristics of these fields are listed below.

- Fields are spaces less than one to two miles apart.
- Fields range from 640 acres to 6,400 acres.
- Each field, at maximum development, contains between one and three exploration wells, between one and nine development wells, a maximum of one CO2 injection well for pressure maintenance or secondary recovery, and a maximum of one water disposal well.
- Wells produce by gas lift.
- Initial daily production potentials of wells range from 0 to 2,800 barrels of oil, 0 to 3,500 mcf of gas, and 0 to 150 barrels of water.
- Well depths range from 14,000 to 17,000 feet.
- Ultimate recoverable reserves for fields range from less than 100,000 barrels of oil to 30 million barrels of oil.
- The lives of producing wells range from 12 to 35 years.
- Wells are spaced from 0.5 to 1.0 mile apart (320- to 640-acre spacing).
- Each well's, lease equipment is configured on a site covering one to two acres.
- Equipment for a single well includes: a wellhead valve assembly (Christmas tree), flow tubing (2- to 3-inch diameter), which connects the wellhead to a central tank battery, and a line heater unit which is located along the flow tubing.
- A central tank battery serves each field. A tank battery is comprised of separation equipment, dehydration equipment, and storage tanks. Each tank battery generally requires between 0.5 and 1.0 acres per producing well.
- A 2- to 3-inch diameter gas pipeline links the central tank battery to a refrigerated process gas processing plant.
- The gas plant covers an average of five acres and processes gas for the entire field.
- A 6- to 8- inch diameter gas pipeline transports gas from the plant to a regional pipeline off the forest.

- Flow tubing and gas pipelines on the forest are buried along access roads; otherwise, they are constructed within a 30-foot-wide zone.
- An average of 0.3 mile per well of buried flow tubing or gas pipelines are presumed outside road rights-of-way.
- Development wells require 0.4 mile of reconstruction of roads and 0.4 mile of road reconstruction or new construction.
- The land surface disturbance (after cut-and-fill reclamation) is 2.4 acres per mile for light reconstruction of raids and 3.6 acres per mile for heavy reconstruction or new construction of roads.
- Most field development occurs within five years after discovery.

The total land area that could be disturbed by development for each of the first two fields would be about 35 acres.

APPENDIX B - 11

Social and Economic

Economic Resource Output Assumptions

Recreation Analysis Assumptions

Two factors were considered in projecting changing demand for recreation, potential demand and future population growth. To develop estimates, past change in recreation demand was compared to population change over the same period for the area. It was thought that calculating a similar change in recreation demand based on projected overall population growth for the area would be reasonable.

Change in recreation demand was from 1984-1997 based on 1997 RIM was based on 5,810,956 to 6,658,491. 847,535/5,810,856 = .15 or 15%. During the same period population increased 29%. (See attached pencil calculations, 2/19/01). So for a 29% increase in population, recreation increased 15%, or a ratio of 15/29.

From 2000 to 2010 population is projected to increase 22% for the analysis area. Given a ratio from 1) above all recreation could be expected to increase 11%.

15 is to 29 as X is to 22 15/29 = X/22
29X = 22x15
29X = 330
X = 11% = *Base change rate for recreation*

This factor was used for determining base increase over the 10 years from 2000-2010 for all categories below (except as otherwise noted) as it represents overall growth in demand. Growth projections for any individual category could have been estimated from trends in that particular category, but it was thought that rise in any particular category might be subject to more sampling error, other bias, or other uncertainties than for an overall factor, so the overall factor was considered a more reliable growth projection.

1) Camping, Picnicking, Swimming – Almost no new FS recreation facilities will be developed under any alternative. Shoulder seasons at developed will see more use as capacity at other times forces larger population to schedule developed activities at times when [previously no one used the areas. Project 5.5% or ½ of *Base change rate for recreation* as rate of recreation increase across all alternatives above current. 1,721,000 X 1.055 = 1,815,655
2) Mechanized Travel and Viewing Scenery – Projected gain at 11% or *Base change rate for recreation* as rate of recreation increase across all alternatives above current. 2,283,000 X 1.11 = 2,534,130

3) Hiking, Horseback Riding & Viewing Scenery - Projected gain at 11% or *Base change rate for recreation* as rate of recreation increase across all alternatives above current. 423,000 X 1.11 = 469,530
4) Winter Sports – Current projections include winter-dispersed activities, excluding Developed Ski Areas. Project 11% base change rate for this recreation category as a rate of recreation increase across all alternatives except above current. 161,000 X 1.11= 179,000.
5) Resorts, Cabins, & Organization Camps – No new facilities of this type projected. Keep same as current across all alternatives. 295,000
6) Other Recreation Activities – These activities include a lot of categories where interpretation is offered. Increases are largely dependent on budget. While demand for these kinds of programs is desirable, it is unlikely that we will have much funding to increase in these areas, under most alternatives. Some possibility of increase particularly in Alternative 2 (general education on Ecosystems) , Alternative 3 (education related to travel opportunities and visitor responsibility) and Alternative 6 (Preferred) – What should be done with some funding to increase user awareness and responsibility. Project 5.5% or ½ of *Base change rate for recreation* for Alternatives 2, 3, and 6 above current level. Keep Alternatives 1, 4, and 5 at current level. 229,000 or 229,000 X 1.055 = 242,000
7) Snowmobiles – Decrease in use Alternative 1 by 11% and Alternative 2 by 5.5%. It is thought that decrease in available acreage for snowmobiles will not greatly effect demand, but would slightly and used a reduction equal to the general growth estimator used previously. It is likely many people would continue to use snowmobiles, and simply crowd more into available areas. Some use is displaced to other public lands, forests or states. Use the same factors as were used for increases in other categories above. Increase values in Alternatives 3-6 at *Base change rate for recreation*. 34,000 X .89 = 30,000, 34,000 X .945 = 32,000, or 34,000
8) Developed Ski Areas – a projected rate of growth of 4% is used to 2010 for all alternatives except Alternative 5. (The projected growth by ski areas of 3.4% to 2007 in Affected Environment was increased slightly for the additional 3 years.) For Alternative 5 increase above current by 6%, given possible expansions and, perhaps more heliski, that is allowable. (Growth of use at Snowbasin due to recent expansion is included.) 1,367,000 or 1,367,000 X 1.04, or 1.06 = 1,422,000 or 1,450,000.

Assumptions for Fishing, Hunting and Wildlife Viewing Economic Analysis

Assume Fishing will increase 22% (level of population increase) by 2010 across all alternatives. This is thought to be a conservative growth estimate, based historic 26% increase. (For detailed rationale and data, see Cowley and Williams, 2001, paper on file.)

Assume big game hunting will stay same across all alternatives based on current Utah Division of Wildlife Resources control of permits.

Assume small game hunting and wildlife viewing to increase at half the rate of human population increase, the general assumption used for most recreation.

Fishing

Assumptions:

1. Statewide it is estimated that 25 percent of all fishing which occurs in Utah on the National Forest lands occurs on the Wasatch-Cache National Forest.
2. Most people will travel less then 1 hour away from their homes to go fishing
3. The major population centers in Utah are along the Wasatch Front adjacent to the Wasatch-Cache and Uinta National Forests.
4. Fishing on an acre of the Wasatch-Cache National Forest in Utah will generate comparable economic impacts as an acre on the Forest in Wyoming. Values for the Wyoming portion of the Forest were derived from generating an impact per acre (USDA 1998) for Utah and then multiplying this by the total acres in both states. Wasatch-Cache National Forest acres in Utah are 848,183, Wyoming are 37,762, total 885,845. This does not include the Snow Basin Land Exchange increase in acres.

Values used in analysis - RVDs = 395,341 for Current

Hunting

Continues to increase or remain level through this next planning period. The economic impact of hunting on the Wasatch-Cache National Forest in 1996 was approximately $14,000,000 with a total economic effect of $29,000,000. A total of 459 jobs rely on this activity on the forest to support them. Big game hunting on the Wasatch-Cache provides and economic impact of $7,900,000 while small game provides an economic impact of $2,400,000.

Assumptions:

1. Statewide it is estimated that 1/6 or 17 percent of all big game hunting which occurs in Utah on the National Forest lands occurs on the Wasatch-Cache National Forest.
2. Statewide it is estimated that 1/6 or 17 percent of all small game hunting which occurs in Utah on the National Forest lands occurs on the Wasatch-Cache National Forest
3. No migratory bird hunting occurs on the Wasatch-Cache National Forest
4. The major population centers in Utah are along the Wasatch Front adjacent to the Wasatch-Cache and Uinta National Forests.
5. Hunting on an acre of the Wasatch-Cache National Forest in Utah will generate comparable economic impacts as an acre on the Forest in Wyoming. Values for the Wyoming portion of the Forest were derived from generating an impact per acre (USDA 1998) for Utah and then multiplying this by the total acres in both states. Total Wasatch-Cache National Forest acres in Utah 848,183, Wyoming 37,762, total 885,845. This does not include the Snow Basin Land Exchange increase in acres.
6. Big game hunting has remained constant in the State of Utah since 1996. Big game hunting in Wyoming has continued to increase proportionate to the rest of the nation since 1996.

Values used in analysis - Big Game - RVDs = 77,677 for Current

Values used in analysis - Small Game - RVDs = 45,478 for Current

Wildlife Viewing

Economic impacts of wildlife viewing on National Forest lands totaled $2.1 billion in 1996. Wildlife viewing participation and expenditures declined nation wide by 16% and 12%, respectively over a five-year period from 1991 to 1996. It is believed that the mild recession of the mid 1990's is to blame for this. The economic impact of wildlife viewing on the Wasatch-Cache National Forest in 1996 was approximately $7,000,000 with a total economic effect of $15,000,000. A total of 261 jobs rely on this activity on the forest to support them.

Assumptions:

1. Statewide it is estimated that 25 percent of all wildlife viewing in Utah on the National Forest lands occurs on the Wasatch-Cache National Forest.
2. Most people will travel less then 1 hour away from their homes to do wildlife viewing fishing
3. The major population centers in Utah are along the Wasatch Front adjacent to the Wasatch-Cache and Uinta National Forests.
4. Wildlife viewing on an acre of the Wasatch-Cache National Forest in Utah will generate comparable economic impacts as an acre on the Forest in Wyoming. Values for the Wyoming portion of the Forest were derived from generating an impact per acre (USDA 1998) for Utah and then multiplying this by the total acres in both states. Total Wasatch-Cache National Forest acres in Utah 848,183, Wyoming 37,762, total 885,845. This does not include the Snow Basin Land Exchange increase in acres.

Values used in analysis - $118.36 per user day and RVDs = 125,887 for Current

Assumptions for Oil and Gas Economic Analysis

The number of wells to be drilled could vary based on the reasonably foreseeable development scenarios of each alternative. Deliverable oil from each well at an average level is in excess of one million barrels of oil per well over a twenty-year period. In this high cost, high risk area, exploration ventures are justified only by the potential of a high return on investment which results from finding a field like Bridger Lake where average reserves per well exceed one-million barrels of oil (Kaldenbach, 1990).

The North Slope of the Uinta Mountains is predominately an oil production effort; natural gas is produced as a by-product only (Burkhardt, Intermountain Region Leasable Minerals Specialist, personal communication, 2001). Therefore no prediction for production of cubic meters of gas is made.

Conversion factor 1 cubic meter = 6.34 barrels

Current and No Action Alternatives cubic meters of oil produced = 52000 (Calculated from data of average of 1997, 1999, and 2000 production, no 1998 data available. Mary Ann Spindler, USFS Intermountain Region.)

Alternative 1: 2 wells = 2-millon barrels = 315,000/20 years = cubic meters + Current.

Or 16,000 + 52,000 = 68,000

Alternative 2: 2 wells = 2-millon barrels = 315,000/20 = cubic meters + Current.
Or 16,000 + 52,000 = 68,000

Alternative 3: 9 wells = 9-millon barrels = 1,420,000/20 cubic meters + Current.
Or 71,000 + 52,000 = 123,000

Alternative 4: suspension continues; no decision made. Current production assumed.
Or 52,000

Alternative 5: 12 wells = 12-millon barrels = 1,893,000/20 cubic meters + Current.
Or 95,000 + 52,000 = 147,000

Alternative 6: 9 wells = 9-millon barrels = 1,420,000/20 + Current.
Or 71,000 + 52,000 = 123,000

Alternative 7: 10 wells = 10-millon barrels = 1,577,000/20 + Current.
Or 81,000 + 52,000 = 133,000

Therefore, for each of the above alternative values, 52,000 is added to develop total value in CUBIC METERS for an alternative. Cubic meter estimates for each alternative have a factor of 20 in the calculation, which is used to annualize the estimated 1,000,000-barrel production per well.

Assumptions for Grazing

For the current levels of use an average of AUMs for 10 years (1990 to 1999) authorized (actual use, not permitted use) was used, rounded to the nearest 1,000. This value was based on the historic use table and provided in the affected environment section. AUM projections were based on changes in the amount of suitable range[1] by alternative. These changes are based on capable acres within allotments minus:

1. Developed recreation sites within those allotments;
2. Uplands and/or riparian acres not meeting forest plan objectives;
3. Vacant allotments closed; and
4. Allotments voluntarily closed.

Each alternative has a different combination of these criteria.

Alternatives 1 and 2 would close existing vacant allotments and, therefore, outputs would be similar to the current situation. In addition, in Alternative 2 the acres of watersheds within allotments that have at least 210 acres of riparian areas either verified or estimated as not meeting forest plan objectives that also had TES fish populations (aquatic habitat for TES fish)

were removed from suitable acres. This included portions of the Woodruff, Logan Canyon, North Rich, West Fork, Smiths Fork, Gilbert Creek, Blacks Fork, Middle Fork, and Walker Allotments. All other alternatives would allow for the restocking of one or more of the vacant allotments, allowing for the potential to increase grazing levels on the forest. This potential increase would require additional site-specific analysis priori to stocking and is unlikely in the planning period because the forest would likely devote its limited range planning resources to allotments currently open and stocked. Therefore, AUM projects do not include an increase for stocking these allotments, but indicate a lowest possible level. The values used in IMPLAN modeling are shown in Table B11-1 below.

For modeling purposes, it was assumed that changes to Forest Service revenues for each alternative are proportional to changes of AUMs by alternative.

Table B11 - 1. Estimated livestock outputs based on the forest-wide 10-year average, maximum, and minimum actual authorized AUMs (rounded to the nearest 1,000).

Alternative	Multiplier x Current	Year	Sheep AUMs	Cattle AUMs	Total AUMs
Current		10 year maximum	31,000	39,000	70,000
		10 year minimum	14,000	16,000	30,000
		10 year average	25,000	34,000	59,000
Alternative 1	1.00	Maximum	31,000	39,000	70,000
	1.00	Minimum	14,000	16,000	30,000
	1.00	Average	25,000	34,000	59,000
Alternative 2	0.91	Maximum	28,000	35,000	63,000
	0.90	Minimum	13,000	14,000	27,000
	0.90	Average	23,000	31,000	54,000
Alternatives 3, 4 & 5	1.08	Maximum	33,000	42,000	75,000
	1.12	Minimum	16,000	18,000	34,000
	1.10	Average	28,000	37,000	65,000
Alternative 6	1.04	Maximum	26,000	35,000	61,000
	1.04	Minimum	29,000	37,000	66,000
	1.04	Average	13,000	15,000	28,000
Alternative 7	1.00	Maximum	25,000	34,000	59,000
	1.04	Minimum	26,000	35,000	61,000
	1.02	Average	26,000	35,000	61,000

[1] Table RN-4 in the FEIS shows the relationship among all alternatives and factors used in determining suitable range.

Social and Economic Analysis Assumptions and Information

The Economic Setting

Information related to economics is readily available from many sources. State governments for Wyoming and Utah provide websites with information on state, county and local income, employment, and agricultural statistics. These websites and published information were

investigated to develop information on the economic setting. (See References.) As with the social setting, the intent for economics was to provide a focused description of the economic context that was relevant to the Wasatch-Cache National Forest and this forest planning effort and its needs. Noting the contribution which national forest related activities make to the overall economy was important.

The Model

Economic effects to local counties were estimated using an economic input-output model developed with IMPLAN Professional 2.0 (IMPLAN). IMPLAN is a software package for personal computers that uses the latest national input-output tables from the Bureau of Economic Analysis, secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for the analysis area. The process and software were originally developed by the USDA-Forest Service and are now the property of the Minnesota IMPLAN Group (MIG, Inc.). The IMPLAN model was developed using 1999 data, the most recent data available at the time of model development.

IMPLAN is the accepted software that the Forest Service employs for forest plan economic analysis. Input to the IMPLAN program is organized in standardized Microsoft Excel spreadsheets, which have been prepared for agency-wide use by a team of Forest Service economists (FEAST Spreadsheets, Niccolucci, 12/14/2000). The Quicksilver ™program was used for the required present net value analysis. Technical assistance and advice in using these programs and in the development of models and the scope of the analysis was provided by personnel from Forest Service Regional Offices in Ogden and Denver, and by the Forest Service's Inventory and Monitoring Institute in Fort Collins, Colorado.

Forest Service economists determined that the urban and suburban areas along the Wasatch Front and adjacent to the Wasatch-Cache National Forest had a large economy not necessarily related to Forest outputs, so economic impacts generated by forest planning alternatives would be small when shown within the context of that large economy. Also, large western areas of Tooele and Box Elder Counties that are far from the Wasatch-Cache Forest were considered generally beyond the influence of decisions made on the Forest. Consequently, these areas could be eliminated from impact analysis. Using Zip Code boundaries a model was created to separate urban/suburban areas from rural areas. By excluding areas beyond influence of the Forest and urban areas, the potential impacts of Forest management could be highlighted in rural areas surrounding the Forest.

The Wasatch Cache National Forest model represents the areas most likely to be economically impacted by changes in Forest management. The area is not a functioning economy as many of the goods and services residents require are not available inside the model area, but the smaller model allows direct impacts to the area to be analyzed without the larger metro areas along the Wasatch Front from 'washing-out' results. The U.S. Postal Service's website (www.usps.gov) was queried to get Zip Codes for the town listed below which are included in the analysis. Counties included in Wasatch Cache National Forest IMPLAN model are displayed in the following table (B11 – 1).

Table B11 - 1. Counties included in the Wasatch Cache IMPLAN models

Model Area	
County	State
Box Elder	Utah
Cache	Utah
Salt Lake	Utah
Summit	Utah
Tooele	Utah
Weber	Utah
Morgan	Utah
Rich	Utah
Uinta	Wyoming

In general, urban and suburban areas along the Wasatch Front from the south Salt Lake County line north to the north Weber County line are excluded from the analysis. The unique Zip Code areas of Alta and Snowbird were an exception and included for analysis. Zip Code areas were chosen to approximate urban and suburban areas for Logan, Tooele, and Brigham City, which are excluded from economic impact analysis.

Evanston was included in the analysis. While this city met criteria for urban for which cities of similar size were excluded from impact analysis, Evanston's local economy was thought to be somewhat different with heavier dependence on resource extraction and National Forest related industries: oil and gas, grazing, timber, agriculture, and as a staging area or portal for recreation to the Uintas.

<u>List of Zip Codes included in impact analysis.</u>

1. Remaining Box Elder County Zip Codes (Bear River City (84301), Collinston (84306), Corinne (84307), Fielding (84311), Garland (84312), Tremonton (84337), Willard (84340)
2. Much of remaining Cache County – including Cache Junction (84304), Clarkston (84305), Cornish (84308), Hyrum (84319), Lewiston (84320), Mendon (84325), Newton (84327), Paradise (84328), Richmond (84333), Smithfield (84335), Trenton (84338), and Wellsville (84339)
3. All Morgan County is considered rural.
4. All Rich County is considered rural.
5. Remaining Tooele County Zip Codes – including Dugway (84022), Grantsville (84029), Rush Valley (84069), Stockton (84071)
6. Salt Lake County (Snowbird and Alta (84092) Brighton and Solitude (84121)
7. Remaining Summit County Zip Codes – including Coalville (84017), Henefer (84033), Kamas (84036), Oakley (84055), Peoa (84061)
8. All Uinta County, WY Zip Codes.
9. East side Weber County Zip Codes (Eden (84310), Huntsville (84317)

All dollar values reported in the economic section were converted to real 2000 dollars using Gross Domestic Product inflation adjustment factors prepared and released on 02/19/1999 by the U.S.D.A. Forest Service Washington Office Program Development and Budget staff and posted on the Forest Service Inventory and Monitoring Institute intranet web site. This allows consistent comparison of current values with past and future values.

Economic Environment

The description of the economic environment examines the contribution that forest related industries make to industry output and employment within the analysis area. Specific IMPLAN sectors were selected as a proxy, or representation of the forest resource-related industries of interest in Forest planning. The following table (B11 – 2) illustrates the sectors selected are displayed in the following table, grouped by the forest resource-related industries they represent.

Table B11 - 2. Sector Aggregation Used Separate Forest Related Industries

Sector	Forest Resource-Related Industry
Recreation and Tourism Support	
454	Eating And Drinking
463	Hotel And Lodging
488	Amusement and Recreation Services
Wood Products	
133	Logging Camps And Logging Operations
134	Sawmills And Planning Mills
Mining	
38	Crude Oil
Grazing	
004	Ranch feed cattle
005	Range feed cattle
006	Sheep and goat grazing

As explained above, the Recreation-Tourism Support industry information is not a separate sector, but a combination of businesses that play a part in recreation and tourism activity around the Forest. Because these businesses also serve individuals not engaging in recreation and tourism, it is important to note that a portion of each business serves other local or business needs not directly related to recreation and tourism. The split between local and tourism related activity was not estimated, this should be considered when reviewing the analysis.
The results of the contribution analysis are only a proxy of employment related to Wasatch Cache National Forest resources. Results would differ if other sectors were included as forest resource-related. In the analysis presented, a consistent and conservative approach was taken to illustrate the relative importance of the Wasatch Cache National Forest activity within the analysis area.

Economic impact analysis describes what happens when a change in final sales (e.g. exports and consumer purchases) occurs for goods and services in the model area. Changes in final sales are the result of multiplying units of production (e.g., hundred cubic feet of timber harvest or recreation visitor days (RVDs) of recreation use) multiplied by sales per unit. Economic impacts

were estimated using the best available production and sales data. The source of each are listed below.

Economic Impact Analysis

Impacts to local economies are measured in two ways: employment and labor income. Employment is expressed in jobs. A job can be seasonal or year-round, full-time or part-time. The number of jobs is computed by averaging monthly employment data from state sources over one year. The income measure used was labor income expressed in 2000 dollars. Labor income includes both employee compensation (pay plus benefits) and proprietors' income (e.g. profits by self-employed).

The analysis area model was used to determine the employment and income consequences throughout the economy of one-million-dollar changes for each kind of impact. The results are called response coefficients. Because input-output models are linear, multipliers or response coefficients need only be calculated once per model and then applied to the direct change in output. Spreadsheets were used to calculate total effects by multiplying the response coefficients by estimated levels of dollar activity. A customized Excel workbook called FEAST (Forest Economic Analysis Spreadsheet Tool) was developed and used for this purpose. Details of FEAST may be examined in the project record. Specifications for developing response coefficients and levels of dollar activity are stated below.

Recreation and Tourism

Expenditure Data

Visitors to the National Forests in Idaho often engage in a variety of activities during a trip. Six recreation categories were considered for the FEIS to compare between alternatives. Expenditure data was obtained from Public Area Recreation Visitor Surveys (PARVS) conducted from 1985 through 1987 and combined with data from approximately 5,100 customer surveys conducted on 55 Forest Service Ranger Districts from 1988 to 1996. These recreation expenditure profiles were incorporated into the models for the categories.
Recreation use numbers were based on 1997 RIM numbers and adjusted through discussions and consensus among the Recreation Specialists from the Ranger Districts and Supervisor's office. The Forest recreation specialists estimated the percentage of use from outside the model area, non-resident use, for the six categories of recreation use.

The PARVS expenditure profiles were adjusted to use Regional Purchase Coefficients (RPCs) to estimate the amount of local spending in both rural and urban models. PARVS resident data reflects expenditures by persons within a 50-mile radius of the analysis area. Non-resident data reflects expenditures by persons traveling to the analysis area from more than 50 miles away. All PARVS expenditure profiles were normalized to allow for response coefficients calculations. For specific expenditure information, please refer to the FEAST and IMPLAN outputs available in the planning record.

The unit of measure used to estimate recreation use was Recreation Visitor Days (RVD). One RVD is equal to 12 hours of a given activity for one person. However, most people do not

participate in one recreation activity for a full twelve-hour day. Since the PARVS expenditure data is expressed in dollars per person per day/visit, it was necessary to convert the RVD data into the equivalent number of visits in order to more accurately estimate visitor expenditures. The assumptions used for the conversion of RVDs to visits are detailed in the following table (B11 – 3):

Table B11 – 3. RVD Conversion Factors—Recreation

Activity Category	Average Duration of Activity per Visit	RVD Conversion Factor
Camping, picnicking, swimming	3.63 hours	2.7
Mechanized travel and viewing	2.63 hours	3.4
Hiking, horseback riding and water sports	4.17 hours	3.2
Winter sports	4.40 hours	3.0
Resorts, cabins, organization camps	10.07 hours	1.2
Other recreation	3.00 hours	3.0

Source: USDA Forest Service, 1981.

The 'Camping, Picnicking, & Swimming' category includes all camping and picnicking activities. 'Mechanized Travel & Viewing' includes all biking, snow machines, OHV use, driving for pleasure and scenic viewing activity. 'Hiking, Horseback Riding & Water Travel' includes all hiking, water sports, motor boating, mountain climbing, and horseback riding occurring on the Forest. The 'Winter Sports' category includes cross-country and downhill skiing and snow play. 'Resorts, cabins, and organization camps' includes all special use permits for lodges and large group overnight use. Snowmobiling information was based on a survey of expenditures and visits completed by Utah State Department of Recreation and Tourism (McCoy, et. al., 2000). Downhill skiing information for expenditures and trips are based on the 1999-2000 Utah Skier Survey, (Wikstrom, 2000), as well as professional knowledge about downhill ski use. All other types of recreation are included in the 'Other recreation' category.

Use of the Model

One million dollars of expenditures for the categories of recreation discussed above were input into the IMPLAN models. The results were then incorporated into the FEAST workbook where they were multiplied by total expenditures for each category. Only non-local recreation expenditures (tourism export) use was considered in the impact analysis.

Fish and Wildlife

Expenditure Data

The U.S. Fish & Wildlife Service (USFWS) periodically conducts a national survey to obtain, among other information, data on recreation expenditures for hunting, fishing, and other wildlife-related recreation. This information is available by state. The Forest Service Inventory and Monitoring Institute organized these expenditures profiles for use in IMPLAN. Expenditures were collected on a "per trip" basis, but converted to a person-day basis for use in IMPLAN. Expenditure profiles for resident expenditures in Idaho were used for estimating impacts from wildlife-related recreation.

The USFWS expenditure profiles were adjusted to use RPCs to reflect local spending in both the rural and comprehensive models. As with the recreation expenditure profiles, resident data reflects expenditures by persons within a 50-mile radius of the analysis area and non-residents are from outside the 50-mile radius. All USFWS expenditure profiles were normalized to allow for response coefficients calculations.

Use data for general hunting, general fishing and non-consumptive wildlife use are based on 1997 RIM numbers and adjusted through discussion and consensus among the Recreation Specialists from the Ranger Districts and Supervisor's office, as well as calculations based on 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, (USDI-USDC, 1996). The Forest recreation specialists estimated the percentage of use from outside the model area, non-resident use, for the six categories of recreation use.

To use the USFWS per visit expenditure profiles, the use units had to be converted into visits. The conversion factors used are highlighted in table B11 - 4.

Table B11 - 4. RVD Conversion Factors—Wildlife and Fish

Activity Category	Average Duration of Activity per Day	RVD Conversion Factor
General hunting	7.1 hours	1.69
General fishing	4.3 hours	2.79
Non consumptive wildlife	3.0 hours	4.00

Source: U.S.D.A Forest Service, 1981.

Use of the Model

One million dollars of expenditures for the three categories of fish and wildlife discussed above were input into the IMPLAN models. The results were then incorporated into the FEAST workbook where they were multiplied by total expenditures for each category. Only non-local recreation expenditures (tourism export) use is considered in the impact analysis.

Grazing

Expenditure Data

Marketing and inventory data was obtained from 1999 Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report (Gneiting, et, al., 1999) and USDA's website for agricultural statistics (www.nass.usda.gov/wy/internet/cnty data). The State's total marketing income for cattle and sheep was divided by the total inventories for the same in order to develop an estimated value per animal and then a value per Animal Unit Month (AUM). An AUM is the amount of forage needed to sustain one cow or approximately three sheep for one month. Forest grazing use was estimated based on the number of AUMs currently permitted. Through the FEAST workbook, this data was multiplied by the value determined above to calculate the value of the grazing that occurs on the Forest.

Use of the Model

One million dollars of exports were input into the IMPLAN models through the range fed cattle and sheep, lambs, and goat sectors to determine "response coefficients." These response coefficients were then applied to the value of the livestock grazed on the National Forest to estimate the total economic impact. Details of distribution estimates are available in FEAST, which is located in the project record.

Timber

Expenditure Data

Logging, sawmills and fuel wood where identified as the majority of uses for Wasatch Cache National Forest System stumpage. Employment in the lumber and wood products industry was estimated through the IMPLAN model. Details of distribution estimates are available in FEAST, which is located in the project record.

Timber volumes and revenues for the current situation were based on the average harvest volumes and stumpage revenues for 1998, 1999 and 2000. Volume estimates for each of the alternatives were developed based on vegetation modeling and historic management levels on the forest during the last planning period.

Use of the Model

One million dollars of stumpage exports were modeled through each timber-processing sector to determine a "response coefficient." Timber volume from the National Forests was multiplied by historical stumpage prices and multiplied by the response coefficient for to obtain the total economic impact for presentation in the FEIS. This process was repeated for each alternative.

Oil and Gas

Expenditure Data

Oil and gas production where identified as of uses of the Wasatch Cache National Forest System. Employment in the oil and gas industry was estimated through the IMPLAN model. Details of distribution estimates are available in FEAST, which is located in the project record. Volumes in cubic meters and revenues for the current situation and each alternative were based on continued and future drilling as outlined earlier in this appendix.

Use of the Model

One million dollars of crude oil exports were modeled through the processing sector to determine a "response coefficient." The oil and gas out value for each alternative was then multiplied by the response coefficient to determine total economic impact for each related sector. All results were then summed for presentation in the FEIS. This process was repeated for each alternative.

Federal Expenditures & Employment

Expenditure Data

The Forest applied budget constraints to every alternative. This budget constraint was used to estimate total Forest expenditures, some of which had local economic effects. Total Forest obligations by budget object code were obtained for actual expenditures in 1999 from the National Finance Center. All dollars were adjusted to 2000. This data was used to estimate how the budget would be spent between programs. Details regarding the expenditures may be found in the project record. Forest Service employment was estimated by Forest staff based on current organizational charts and projections of future staffing levels based on expected workloads and budgets.

Use of the Model

To obtain an estimate of total impacts from Forest Service spending, salary and non-salary portions of the impact were handled separately. Non-salary expenditures were determined by using the budget object code information noted above. This profile was input into the IMPLAN models for non-salary expenditures for one million dollar expenditure, and the results multiplied by total Forest non-salary expenditures. Sales to the Federal Government are treated in the same manner as exports, money coming from outside the model area.

Salary impacts result from Forest employees spending a portion of their salaries locally. IMPLAN includes a profile of personal consumption expenditures for several income categories; the average compensation for an employee on the Uinta National Forests fell in the category of $40,000-$49,999. Across the U.S., Americans typically spend about 67% of their total salary plus benefits. Therefore, total Forest Service salaries were multiplied by 0.67 before being multiplied by the one million dollar response coefficient.

Revenue Sharing -- 25% Fund Payments

Expenditure Data

Historically, Federal law has required that 25 percent of current or historical revenues be returned to the States and Counties within which the revenues were received. These payments may be used for a variety of purposes, including schools and roads. The *Secure Rural Schools and Community Self-Determination Act of 2000* provides a new formula for computing annual payments is based on averaging a state's three highest payments between 1986 through 1999 to arrive at a compensation allotment or "full payment amount." All counties except Rich County choose stable payments, for the purposes of this analysis it was assumed that these revenues would be returned to the local impact area, and that a split of 50 percent for schools and 50 percent for roads would represent how local governments spend these revenues. A profile of expenditures for each of these purposes was derived from the model itself. Details regarding the expenditures may be found in the project record.

Use of the Model

The national expenditure profile for state/local government education (schools) and local model estimates for road construction (roads) are provided within IMPLAN. One million dollars of each profile was used to obtain an estimate a response coefficient for these Forest Service

payments to impact area counties. The results were then incorporated into the FEAST where they were multiplied by total expenditures. Sales to local government are treated in the same manner as exports.

Output Levels

Output levels are specified in the FEAST Excel workbook, located in the project record and are highlighted in each resource section of this FEIS.

Financial and Economic Efficiency Analysis

Net Public Benefits

Net public benefits are the "overall long-term value, to the nation, of all outputs and positive effects (benefits) less all associated Forest inputs and negative effects (costs) whether they can be quantitatively valued or not" (36 CFR 219.3). Net public benefits represent the sum of the net value of priced outputs plus the net value of non-priced outputs.

Financial efficiency is defined as how well the dollars invested in each alternative produce revenues to the agency. Economic efficiency is defined as how well the dollars invested in each alternative produce benefits to society. Present Net Value (PNV) is used as an indicator of financial and economic efficiency.

The table B11 – 5 below highlights each activity included in the analysis, the unit of measure, and the economic and financial benefit of each. The economic benefit is an estimated market clearing price (what the resource would be priced at if available in the private sector) and consumer surplus (the estimated value a person has for a resource above the price actually paid). In this way, the PNV economic analysis attempts to account for the values people hold for forest resources, even though they may not have to pay for them. The financial value is a measure of the revenues actually received by the Forest Service for resource extraction, access, or use. As displayed in the following table, recreation activities tend to have low, or no revenues collected by the Forest Service while both grazing and wood products have associated fees. Although with the recreation fee program and increasing management of recreation sites by concessionaries, the revenues collected by the recreation program is likely to increase in the future. Costs associated with the PNV analysis are taken from the budget estimates for full implementation of each alternative.

Table B11 - 5. Economic Benefits And Financial Revenue Values In 2000 Dollars

Activity	Unit	Economic Benefit	Financial Value
Camping, picnicking, swimming	RVD	13.60	0.03
Mechanized travel and viewing	RVD	16.85	0
Hiking, horseback riding & water sports	RVD	25.44	0
Winter sports	RVD	101.32	0
Other recreation	RVD	77.74	0.01
Mt. Biking	RVD	77.74	0
Snowmobile use	RVD	77.74	0
Off highway vehicles	RVD	77.74	0
General hunting	RVD	94.90	0
General fishing	RVD	126.53	0
Non consumptive wildlife	RVD	129.21	0
Grazing sheep	AUM	10.09	1.10
Grazing cattle	AUM	10.09	1.35
Sawtimber	CCF	1,631.00	147.01
Aspen	CCF	194.00	50.00
Fuelwood	CCF	24.00	0.50

Source: RPA, Uinta National Forest, Quick Silver, 2001.

Information on Social Setting

Several methods were investigated for developing information for this section of the FEIS. Much of the information was developed in April and May 2000, through data gathering in meetings with county planners and ranger district personnel meeting with Forest Plan interdisciplinary team members. Questions were used to stimulate discussions for the development of information on pertinent trends and characteristics of the communities and economy that surround the Wasatch-Cache. These questions were taken from "Methods for Development of Human Geographic Boundaries" (Kent and Preister, 1999), and from the principles and procedures outlined in Forest Service Handbook 1909.17, Social Impact Analysis (7/88). In addition to information gathered in these interactive sessions, a variety of state and county websites, census data, and published information were used to develop the affected environment for social setting. (See References.)

The intent of the information gathering was to provide a focused description of social context within which decisions for the forest plan would be made.

The Wasatch-Cache appreciates the attention and input provided from the following individuals: Box Elder County – Garth Day; Cache County – Mark Teuscher; Davis County – Barry Burton; Morgan County – Amanda Bowen and Kent Smith; Rich County – Al Harrison, Norm Weston, and Kim Wilson; Salt Lake County – Cal Schneller and Tom Roach; Summit County – Senta Beyer; Tooele County – Nicole Cline and Tom Cluff; Weber County – Kevin Hamilton; Uinta County, Wyoming – Ken Klinker, and members of the Uinta County Resource Planning Committee.

Social Effects Analysis

Three Criteria were selected for considering social effects of the alternatives.

Potential effects related Issue 4
This issue was developed to deal economic and social values. The effects of alternatives on several kinds of uses (livestock grazing, timber harvest, oil and gas leasing, and ski areas, and recreation), as portions of the economy, and use interactions have been described previously. Aspects of those these uses which have a social effect lifestyles people involved in livestock grazing, timber harvest, oil and gas work and recreation will be addresses in this section. A narrative discussion of the affects of alternatives is provided for these user groups. We recognize that the public has a broad range of values and interests in how national forest lands are managed, and that this section is difficult to write to meet each individual's or group's expectations or concerns. What are provided are a few general observations on the probable effects of the alternatives to relatively intangible social values described in Issue 4.

Potential effects related concerns of individual counties
A narrative is provided which describes effects to concerns raised by individual counties that were voiced during information gathering for this analysis. Affects to American Indians in the vicinity are also discussed.

Cumulative Effects
A discussion of cumulative effects is provided that gives an interpretation of the longer-term general effects of population changes, demographic shifts, increasing diversity, and social issues related to this forest plan decisions.

Qualitative narrative descriptions of effects are inferred, in part, based on knowledge of the array of management prescription categories across alternatives and considered opinions of the public, Forest Service contacts and personnel from other agencies, and county and state officials consulted during information gathering. Other key data that were available for examination and interpretation included 1) acreages available in ROS by category, 2) proposed Wilderness acres, 3) acres of suitable range, 4) projected timber outputs, 5) projected oil and gas outputs, and the data and trends suggested in the affected environment section as well as professional knowledge.

APPENDIX C - 1

Roadless Area Planning Processes and Evaluation of Roadless Areas for Wilderness

Roadless Area Planning Processes

Introduction

This appendix describes the some of the history and the process used to inventory and evaluate areas on the Wasatch–Cache National Forest for their potential as designated wilderness. Each of the roadless areas is summarized individually describing an area's wilderness characteristics, current resource uses, and the need for the area to be included in the wilderness preservation system.

This appendix is followed by an evaluation of roadless areas based on values identified in the Final Roadless Area Conservation Rule and by the Wasatch-Cache forest plan interdisciplinary team (Appendix C-2). In the Forest Plan DEIS of May 2001 evaluation of roadless areas for Wilderness was combined with their consideration as roadless (undeveloped) areas. In this FEIS the analysis of Wilderness characteristics for roadless areas (Appendix C-1) and the analysis of roadless area values (Appendix C-2) have been separated.

In this analysis roadless areas are grouped within their management areas, and then in sequence generally from north to south starting at the Idaho state line and moving to the southern boundary of the Wasatch-Cache along the Wasatch Front, and then moving from west to east across the Uintas Mountains.

Inventory of Potential Wilderness

Updating the 1983 Roadless Inventory

Past roadless inventories, such as the 1983 Forest Plan roadless inventory were used as a starting point to identify roadless resources on the Wasatch–Cache National Forest. These areas were updated and new areas identified based upon criteria in:

- FSH 1909.12 Inventory and Evaluation of Roadless Areas
- Intermountain draft Roadless Inventory and Evaluation Guide (USFS, 1998)
- 1984 Utah Wilderness Act

A significant change since 1983 roadless inventory was completed as portions of Mount Naomi, Wellsville Mountains, Mount Olympus, Twin Peaks, Lone Peak and Deseret Peak (Stansbury Mountains) roadless areas were designated as wilderness in 1984 by the Utah Wilderness Act. Lone Peak had become a wilderness area earlier with the 1978 Endangered Wilderness Act and no further acreage was added in 1984.

Additional Areas Identified as Roadless

Because different criteria were used for the 1999 inventory than those used in 1983, additional areas were identified as roadless since the 1983 Roadless Inventory: (Those in *italics* below have been added since the DEIS of May 2001 based on their identification in public comments on the DEIS.)

- Temple Peak (Logan Ranger District)
- Right Hand Fork (Logan Ranger District)
- Boulder Mountain (Logan Ranger District)
- *Elk Valley (Logan Ranger District)*
- Mahogany Range (Logan Ranger District)
- Sugar Pine (Ogden Ranger District)
- Rock Creek – Green Fork (Ogden Ranger District)
- Hogsback (Salt Lake Ranger District)
- *Mueller Park (Salt Lake Ranger District)*
- *Red Butte (Salt Lake Ranger District)*
- Lone Peak Additions (Salt Lake Ranger District)

Further, the Mount Logan 1983 roadless area was split into three separate roadless areas, because of constructed roads that were identified.

Areas Eliminated from Wilderness and Roadless Evaluation in the FEIS

A roadless area must have at least 5,000 acres or be contiguous to an existing wilderness area to be included in the roadless area inventory. Some areas were included in an early version of the revised inventory, but have now been eliminated from the inventory due to more recent information that resulted in insufficient roadless acreage for those areas. These areas will not be evaluated as potential wilderness and their values associated with the Roadless Areas Conservation Rule were not considered in comparing alternatives in the FEIS.

- Public Grove Hollow (Ogden Ranger District) – this was a new area identified in an earlier draft of the new roadless inventory, but a constructed road identified later in the process, split the area into two separate areas, both less than 5,000 acres (3,178 and 3,158 acres).
- Lamb Canyon (Ogden Ranger District) – this was a new area identified in an earlier draft of the new roadless inventory, but additional constructed roads were identified, the narrowness of the area and adjacency to substantial private land caused the area to be less than 5,000 acres (4,293 acres).
- Little West Fork Blacks (Evanston/Mountain View Ranger District) – area was identified in the 1983 roadless inventory, but a constructed road identified split the area into two separate areas, both less than 5,000 acres (4,634 and 3,845 acres).

These three areas were shown on alternative management prescription maps in the DEIS, but have been removed from prescription mapping and acreage calculations for roadless for

consideration as Wilderness and RACR values in the FEIS. Individual page-size maps of these three areas are provided with the maps of other roadless areas at the end of Appendix C.

Between the Draft and Final EIS, it was decided to combine the North, Middle and South Francis Roadless areas for the purposes of consideration for Wilderness. Upon examination the interdisciplinary team determined that the cultural barriers (minor power lines and blocks of private lands of similar roadless character) which had been considered area separators during preparation of the DEIS did not significantly interrupt the predominantly undeveloped nature of this landscape.

Consideration of the final Roadless Area Conservation Rule (RACR)

There is a difference between the inventory considered in the National Roadless Area Conservation FEIS and Rule (RACR) (Federal Register January 12, 2001) and the updated Wasatch–Cache Forest inventory used for analysis in this FEIS. Changes to the RACR inventory can only be made by changes to the rule, which is currently involved in several court cases and beyond the scope and control of this forest planning process.

At the time the RACR inventory was published, an inventory of roadless areas had been completed on the Wasatch-Cache (1999). By 2001, locally developed information and public comments on the DEIS clearly showed that some of the areas in the RACR inventory did not meet minimum roadless area size criteria. Additionally, it was learned that some other areas could be added to roadless inventory.

The three areas above that were eliminated in the inventory considered for forest plan revision analysis in this FEIS are still included in the inventory covered by RACR. Therefore, the RACR inventory contains Public Grove, Lamb Canyon, and Little West Fork Blacks, and also all three Francis areas (North, Middle and South) as separate roadless areas. The RACR inventory does not contain Elk Valley, Mueller Park, and Red Butte, as these were added after submissions for RACR inventories were completed.

Acreage values for these areas have changed over time due to a number of factors, including changed mapping criteria and the advent of GIS mapping. Rounded acreage figures are used in this FEIS to try take the focus off minor differences in acreage numbers and place it more appropriately on area characteristics and public needs and sentiments. Table C-1 itemizes changes that have occurred since 1983 to the roadless area inventory on the Wasatch-Cache.

Table C1-1. Wasatch-Cache Roadless Areas: Changes in Numbers and Acreages since 1983

Name	Inventory # in 1983	Inventory # in 1999	1983 Inventory Acres	1983 Inventory GIS Acres	1984 Utah Wldrness Act Acres	1999 Inventory Acres* *rounded acres to the nearest hundred
Gibson	19181	0419002	1836	2695		5300[2,3]
Mount Naomi[6]	19758	0419012	65268	67871	44523	45100[8]
Temple Peak[13]	NA	0419023	0	0		23,400
Right Hand Fork Logan[13]	NA	0419028	0	0		15000
Mount Logan (North)	19759	0419013	33161	37961		19200
Mount Logan (South)	19759	0419029	above	above		17000
Mount Logan (West)	19759	0419030	above	above		5300
Boulder Mountain[13]	NA	0419024	0	0		8800
Elk Valley[17]	NA	0419039	0	0		8800
Mahogany Range[13]	NA	0419025	0	0		11400
Mollens Hollow	19761	0419015	15670	16462		17700
Wellsville Mountains	19760	0419014	23847	24252	22986	1800
Swan Creek	19180	0419001	9569	9501		9400[1]
Rock Creek – Green Fork[13]	NA	0419034	0	0		5700
Sugar Pine[13]	NA	0419031	0	0		5600
Upper South Fork	19764	0419018	11828	13104		17300
Willard	19762	0419016	18306	19561		20000
Lewis Peak	19763	0419017	10878	11489		12100
Burch Creek	19765	0419019	6650	8166		7500
Francis	19756	0419010	15047	15314		15200[16]
Farmington	19755	0419009	9016	10412		10900
Hogsback[13]	NA	0419026	0	0		7900
Mueller Park[17]	NA	0419038	0	0		8400
Red Butte[17]	NA	0419037	0	0		6200
Mount Aire	19754	0419008	9089	9313		9700
Mount Olympus[6]	19753	0419007	24606	24652	15300	10100
Twin Peaks[6]	19752	0419006	12905	18417	11495	6500
White Pine	19730	0419004	2356	1884		2100[5]
Lone Peak Addition[6, 13]	NA	0419027	0	0	9747[14]	900
Stansbury Mountains[6]	19757	0419011	57536	58726	25215	39700[7]
Nobletts	19701	0419003	1671	1876		3100[4]
Lakes	19751	0419005	104109	107415		122000
High Uintas[6]	19901	0419022	153171[10]	272876	179813[1] [1]	103100[12]
Widdop Mountain	19766	0419020	7268	5937		8000[9]

Little West Fork Blacks[13,15]	19767	0419021	8834	8547		4600
Public Grove Hollow[13,15]	NA	0419032	0	0		3600
Lamb Canyon[13,15]	NA	0419033	0	0		4300
TOTAL ACREAGE:			602,261[12]	746,431	309,079	620,800[18]

1983 acres from Appendix C of 1983 DEIS
1983 GIS acres show original roadless areas calculated with newer GIS technology.
Wilderness acres reflect those roadless acres in 1983 inventory that became wilderness.
1999/2000 acres reflect current status of new roadless inventory.
Footnotes:
1 – Contiguous with Caribou National Forest roadless area, which identified 7,300 acres in their 1996 inventory.
2 – Split into two polygons of 7,185 and 2,198 acres by road corridor, but adjacent to Caribou NF roadless.
3 – Contiguous with Caribou National Forest roadless area, which identified 8,320 acres in their 1996 inventory.
4 – Contiguous with Uinta National Forest roadless area, which identified 4,983 acres in their 1998 inventory.
5 – Contiguous with Uinta National Forest roadless area, which identified 1,297 acres in their 1998 inventory. It was not in their 1983 inventory.
6 – Part of roadless area was designated by wilderness in 1984 Utah Wilderness Act or 1978 Endangered Wilderness Act (Lone Peak)
7 – Contiguous with BLM WSA North Stansbury (6,800 acres and an additional 8,040 acres identified in their 1998 reinventory) and BLM WSA Big Hollow (4,300 acres).
8 – Contiguous with Caribou National Forest roadless area, which identified 28,077 acres in their 1996 inventory.
9 – Contiguous with Ashley National Forest roadless area, which identified 1,551 acres in their 1999 inventory. It was not in their 1983 inventory.
10 – Acreage count in 1983 excluded 73,859 acres (High Uintas Primitive Area) and 33,859 acres from 1967 Addition. It is presumed these acres were not counted in roadless inventory because it was assumed these acres were a “given” to become wilderness.
11 – Rest of High Uintas Wilderness acreage is on the Ashley National Forest.
12 – Contiguous with Ashley National Forest roadless area, which identified 342,513 acres in their 1999 inventory.
13 – Area not identified in the 1983 roadless inventory.
14 – Lone Peak Wilderness designated in 1978. Rest of Lone Peak Wilderness acreage is on the Uinta National Forest.
15 – Little West Fork Blacks, Public Grove Hollow, and Lamb Canyon are in the inventory maps shown in Volume 2, Forest Service Roadless Area Conservation FEIS (November, 2000, pg. 189.) Since then we have determined these areas are less than 5,000 acres in size. They are not evaluated for wilderness or considered in alternatives regarding values identified by RACR (see Appendix C-2). Both Little West Fork Blacks and Public Grove Hollow are also divided into two separate polygon areas, because of roads that have been identified.
16 – North, Middle (0419035) and South Francis (0419036) combined into one unit between Draft and Final.
17 – Mueller Park and Red Butte identified by public, verified by Forest Service and added between Draft and Final (11/2001). Elk Valley identified by Forest Service (02/2002).
18 – 600,651 acres if LWF Blacks, Public Grove and Lamb Canyon are excluded. This total is slightly different than the total of 606,400 presented in Topic 5 in the FEIS.

Public Participation for Roadless Inventory

In the fall of 1998, three open houses were held at district offices in the communities of Logan, Evanston and Salt Lake. Maps of each roadless area and the process used to identify them were discussed with the public. Comments helped refine the inventory. Additions of new roadless areas, and suggested deletions from the roadless inventory based on inadequate size have come from further assessment by the interdisciplinary team and acknowledgement of public comments received on the DEIS.

Evaluation of Potential Wilderness

The inventory of roadless areas was evaluated in terms of three primary criteria:

- Capability – the degree to which it contains the basic characteristics that makes it suitable for wilderness designation without regard to its availability or need as wilderness. Characteristics such as naturalness of the environment, the presence of challenging and primitive recreation opportunities and feelings of solitude are determined to be important. Another important aspect is the ability to manage the area as wilderness. Factors such as size, shape, its relationship to external influences and boundary location are considered.
- Availability –other resource demands and uses of an area. Consideration of current constraints or encumbrances is important.
- Need – the degree to which it contributes to the local and national distribution of wilderness. This analysis considers the demand for additional wilderness recreation opportunities, as well as the need to give certain ecosystems and landforms protection that wilderness designation would afford.

Forest Service Manual 1909.12 was used as a tool to aid the evaluation process. The Forest planning interdisciplinary team and District resource staffs then analyzed the roadless areas based on that evaluation criteria, internal comments and public comments received at public meetings or in written formats.

Public Participation for Roadless Evaluation

The public was informed about the public participation opportunities through a newsletter and the forest website. Four public meetings were held in June of 1999.

Recommendation for Wilderness

The Record of Decision signed by the Regional Forester will document the areas recommended as wilderness with the rationale for the decision. The Regional Forester then submits a statewide wilderness proposal to the Chief when all the Forest Plans within a state are finalized. After Department and interagency review, the Secretary of Agriculture submits the proposal to Congress. Congress then makes the final decision on wilderness designation. Areas recommended for wilderness will be protected until Congress decides whether to officially designate them as wilderness.

Changes to Tables on Effects to Wilderness Character

Between the DEIS and FEIS it was determined that additional information on the nature of roadless area values as defined in the FEIS on Roadless Area Conservation should be presented (See Appendix C-2). It was also determined that the consideration of effects on roadless values should be separated from the consideration of the same roadless areas for Wilderness recommendation. Four rows were changed or deleted from the tables entitled Alternatives and Potential Environmental Effects which appeared in the DEIS for each Appendix C roadless area write-up. These rows were entitled:

- Roadless/Wilderness Character Protected (acres) - changed to Wilderness Character Protected (acres) in this consideration of effects on Wilderness character, or information on maintaining roadless values may be found in for each roadless area in tables under the columns Maintains Roadless Character or Mostly Maintains Roadless Character
- Available for Development (acres) – deleted, may be found in tables for each roadless area under the column Allows Development
- Winter Motorized Use Allowed (Snowmobile-acres) – deleted, may be found for each roadless area in Winter Recreation tables
- Winter Motorized Use Allowed (Heliski-acres) – deleted, may be found for each roadless area in Winter Recreation tables.

Information on the effects that was provided in these four rows is now provided in Appendix C-2 that considers effects on individual roadless areas. It was not considered necessary to provide the same information in two places in the analysis, and that the information in these items was properly displayed in Appendix C-2.

Rounding of Acreages for Roadless Areas

Acreage figures for each roadless area are rounded off to the nearest 100 acres. In the DEIS acreage figures were shown to the nearest acre, however, the GIS mapping accuracy for these areas was not accurate to that degree. It is thought that rounding provides a more realistic approximation of the acreage for these roadless areas. Areas may be said to be within 100 acres of the area presented in the tables.

Rationale for applying Management Prescriptions other than recommended Wilderness

Across the range of alternatives presented in the FEIS the application of management prescriptions to roadless areas other than for recommended Wilderness is based on the inherent value of the characteristics of the area (availability, capability and need are described for each area), public values and demands expressed during the planning process, alternative themes, and legal sideboards.

Effects of Alternatives on Potential Wilderness Characteristics

Considerations and disclosures of the effects of alternatives on all roadless areas taken collectively are provided in Chapter 3, Topic 5 of the FEIS.

For each alternative the effects on potential Wilderness for a roadless area are shown in the table entitled Alternatives and Potential Environmental Effects to Wilderness Character that provides:

- Wilderness Recommendations (acres)
- Wilderness Character Protected (acres)
- Motorized Travel Plan Trails Open (miles)
- Motorized Travel Plan Trails Open (miles)

These several data items give a good indication of the intent of management for each area as they are conceived in the alternative, and the potential for affecting its possible Wilderness character. The intent of the analysis is to show how different the allocations are to Wilderness for the roadless areas across the alternatives.

Table C1 - 2. Acres recommended as wilderness by alternative

Roadless Area Name	Roadless Acres	Acres Recommended as Wilderness						
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
CACHE-BOX ELDER								
Gibson	5,300							
Mount Naomi	45,100	40,000	20,300	8,200			8,200	500
Temple Peak	23,400							
Right Hand Fork Logan	15,000							
Mount Logan North	19,200							
Mount Logan South	17,000							
Mount Logan West	5,300							
Boulder Mountain	8,800							
Elk Valley	8,200							
Mahogany Range	11,400							
Mollens Hollow	17,700							
Wellsville Mountains	1,800	1,700	40	40			40	40
BEAR								
Swan Creek	9,400							
Rock Creek Green Fork	5,600							
Sugar Pine	5,600							
NORTH WASATCH – OGDEN VALLEY								
Upper South Fork	17,300	17,200		17,200			14,400	14,200
Willard	19,100	8,300						
Lewis Peak	12,100	12,100						
Burch Creek	6,900	6,900						
Francis	14,800	8,100						
Farmington	10,900							
Hogsback	7,900							
Mueller Park	7,700							
CENTRAL WASATCH								
Red Butte	6,200							
Mount Aire	9,700	9,400						
Mount Olympus	10,000	9,300	2,200	2,000				
Twin Peaks	6,200	5,700	2,300	500				
White Pine	1,900	1,900	1,900					
Lone Peak Additions	900	900	500					
STANSBURY								
Stansbury Mountains	39,700	37,300	17,100	5,000				
WESTERN UINTAS								
Nobletts	3,100	2,700						
Lakes	122,000	119,200	71,900				26,300	38,000
EASTERN UINTAS								
High Uintas	103,100	98,200	29,300	18,200			20,100	20,600
Widdop Mountain	8,000	8,000						

Table C1 – 3. Percentage of Existing and Recommended Wilderness by Alternative

Roadless Area Name	Roadless Acres	Acres Recommended as Wilderness						
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Total Acres	606,400	386,900	145,540	51,140	0	0	69,040	73,300
% of Roadless Recommended for Wilderness		64%	24%	8%	0%	0%	11%	12%
% of Roadless and Existing Wilderness that is Recommended Wilderness or Existing Wilderness	(606,400 +309,100 = 915,500) (Roadless and Wilderness)	76%	50%	39%	34%	34%	41%	42%
% of forest land that is recommended or existing Wilderness	1,239,300 (WCNF Forest Land)	56%	37%	29%	25%	25%	31%	31%

Inventoried Roadless Areas evaluated for Wilderness

Descriptions and Maps

The following descriptions of each inventoried roadless area were written using data available, such as special use permits, oil and gas potential information and information about the current condition of the resource from forest employees. Also included with each roadless area description are maps. BEFORE you look at the maps, please note the following:

- Maps are not at specific scale. The scale used is whatever was needed to fit on the 8.5 x 11 inch page. This means maps of different roadless areas are not at the same scale, because they are of different acreage size.
- Background data shown on the maps is from USGS digital raster graph data; it is for general location background only and has not been updated.
- At this scale, please note that many roads that are excluded from the roadless inventory areas by small “cherrystems” (33 to 66 feet each side of road) cannot be seen.
- To view more detailed maps of roadless areas, please stop by the Wasatch – Cache Supervisor Office or the appropriate Ranger District Office for that roadless area.
- Some roadless areas are adjacent to roadless areas on other Forests (Caribou, Ashley and Uinta) or BLM Wilderness Study Areas (Stansbury unit only). Please contact those agencies to view their roadless area maps.

Another consideration for the reader is the description of an area’s boundary and size and shape as potential wilderness. This is referred to as “Manageability”. It is written to describe the boundaries of each roadless area as they were defined by the inventory protocol. In almost all situations an improved boundary could be mapped that would improve the shape of and the boundary location for a wilderness area.

Evaluation of Roadless Areas for Wilderness

Cache-Box Elder Management Area

Name: Gibson #0419002

Acres: Gross: 5,300

Location and Access: The Gibson area straddles the Utah/Idaho border about 8 miles west of Bear Lake. This report will summarize the portion on the Wasatch-Cache. The western boundary is the Franklin Basin Road 006 going north to Idaho, the northern boundary is the Idaho State line, and the eastern boundary is Utah State land by Beaver Mountain and Logan Canyon Highway 89. Franklin Basin Road, Sink Hollow Road, Logan Canyon Highway and Beaver Mountain Ski Area can access the area.

Setting: The average elevation is about 8,500 feet. The topography is quite gentle with a few steep and rocky slopes. Vegetation cover types include mountain brush, maple, aspen, sagebrush and grass at lower elevations and lodgepole pine, Douglas fir, subalpine fir and spruce at higher elevations.

Availability: Vegetation Treatment: The area has had no recent timber sales on the Wasatch-Cache side, although there is past evidence of earlier logging. There are 2,469 acres of tentatively suited timber within the area. **Recreation:** The area is used for snowmobiling, cross-country skiing, summer ATV use, horseback riding, hiking, mountain biking, hunting, and dispersed camping. Franklin Basin and Sinks Hollow are major winter snow play areas. **Minerals:** Minerals are federally owned. There are no oil and gas leases in the area. **Range:** Sheep are permitted to graze throughout the area. **Water:** The area is within the Logan City municipal watershed. **Land Uses:** A snowmobile rental and guide service under permit utilizes the area. **Roads and Trails:** There are no routes designated as open for motorized use within the area; however, there are many user-created roads and ATV routes in the area. Further surveying of the road system in recently acquired land needs to be completed. The only system trails are Sink Hollow, part of the Great Western Trail (motorized), and a small portion of the Peterson Hollow Trail (non-motorized).

Capability: The **naturalness of the environment** is low to moderate because of past management activities such as logging. User-created trails detract from the area's naturalness. Ecological and biological values are high. Remoteness and **solitude** are moderate to low because of the nearness to roads and ski area development, the small size of the area, and limited screening by vegetation and topography. There are moderate opportunities for **primitive recreation** though opportunities for **challenging experiences** are limited. **Special Features or Attractions:** Deer, elk and moose utilize this important habitat area. A wolverine sighting has been reported. Area is lynx linkage habitat. The Logan River headwaters and Beaver Creek have Bonneville Cutthroat trout present. A rare plant, Hopkins tower mustard, is present. There are no known heritage resource sites and the area has low potential for future discovery of historic and American Indian sites. The scenery values are average. The **manageability** of the area would be poor because of its proximity to the Beaver Mountain Ski Area and the

narrowness of the area between private land in section 3 and the ski area (about ¾ mile). The area is also narrow (about 1 mile wide) near Beaver Mountain Ski Area north to the Idaho State line. It borders about 1.5 miles of private land in the northwest corner.

Need: The area is low for unique landforms and non-motorized recreation needs. It has moderate values for wildlife needs and research purposes. The nearest wilderness is Mount Naomi about 4 miles to the west. The area is 20 to 25 miles from Logan and about 100 miles from Salt Lake. The area received limited public interest in recommending the area for wilderness.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Gibson **Management Area:** Cache-Box Elder							
Alternative:	1	2	3	4	5	6	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	4,700	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Mount Naomi #0419012

Acres: Gross: 45,100

Location and Access: The area is located in Cache County, northeast of Logan and is part of the Bear River Range. Access is via Logan Canyon Highway 89 and can also be accessed via Forest roads in High Creek, Smithfield Canyon, Green Canyon, Tony Grove, and Franklin Basin. The roadless area is composed of several different units all of which are contiguous with the Mt. Naomi Wilderness.

Setting: Elevations range from 4,800 feet to 9,979 feet at Naomi Peak. The western slope (of which most is already wilderness) is very steep. Moderate to gentle slopes are more common on the eastern flank. Sinkholes and caves are found in some locations in the underlying limestone formation. Vegetation on the north and east exposures consist of tall forbs, shrubs, aspen and mixed conifer. The south and west exposures consists of grasses, forbs, shrubs, aspen, mahogany, and scattered conifer. Valley bottoms consist of sagebrush, chokecherry, mountain ash, aspen and mixed conifers.

Availability: Vegetation treatment: There are 19, 212 acres of tentatively suited timber within the area. The area has potential for prescribed burns to benefit habitat improvement. **Recreation:** The area receives heavy recreation use consisting of hiking, backpacking, biking, horseback riding, dispersed camping, rock climbing and hunting, cross-country skiing, snowshoeing and snowmobiling. Most of the mountain biking opportunities are in the northeast quarter and Franklin Basin areas. Some are considered the premier mountain bike trails in the Cache area. Mountain bikes use trails from the Wood Camp Hollow to Jardine Juniper, in Green Canyon, Twin Creek, Bunchgrass Creek, White Pine Creek, White Pine Lake, Blind Hollow, and Hansen Pond. White Pine Lake is a popular summer dispersed recreation site and offers an opportunity for a non-wilderness backcountry experience. Snowmobilers consider this area as one of the top area in the nation to snowmobile. The area provides good winter accessibility and a long season. Tony Grove area is viewed as valuable for late season snowmobile opportunities. **Minerals:** The majority of minerals are federally owned. There is low potential for oil and gas. **Range:** Cattle and sheep are permitted to graze the area. The area has several range improvements especially in the north. **Water:** The area provides water for Logan, Cache Valley, and southern Idaho for irrigation and municipal purposes. Water developments have been proposed periodically in the Green Canyon area. **Land Uses:** There are snow-monitoring sites operated by the Natural Resource Conservation Service near Mount Naomi and in Steep Hollow. An outfitter guide operates two yurts for cross-country skiers. **Roads and Trails:** There are no roads or motorized trails designated as open included in the roadless area.

Capability: The **naturalness of the environment** is outstanding with limited influence by developments. Geological, biological, ecological, educational and historical values are high. The geologic and elevation changes contribute to the area's biodiversity and wildlife habitat. When considered with the existing wilderness and the adjacent roadless area on the Caribou, the area is a part of a very large undeveloped ecosystem. The area is part of a critical wildlife corridor and link between the Yellowstone and Uinta Mountain ecosystems. Steep terrain and topography contribute to feelings of **solitude** and offer **challenging experiences. Primitive recreation** opportunities are abundant. These recreation related values are higher in the southern end and more moderate in Green Canyon and Franklin Basin areas. **Special Features or Attractions:** The area is known for its scenic qualities of unique rock formations, steep bowls, and park like lands. The Mount Naomi Trail from Tony Grove to High Creek Trailhead has been designated as a National Recreational Trail. Logan and Wind Caves and other limestone caverns are special geological features. Jardine Juniper is the oldest known tree of this species. Portions of several streams such as Bunchgrass Creek, White Pine Creek, and the Logan River have been found eligible in the wild and scenic river inventory. Deer, elk, moose, bobcat, cougar, goshawk, golden eagle and grouse inhabit the area. There is habitat for numerous species at risk including boreal owl, Peregrine falcon, and bald eagle. There has been a reported siting of a wolverine, and the area is lynx linkage habitat, and is potential habitat for pine marten. Townsend big-eared bats inhabit Logan Cave. Some streams support native fish such as Bonneville Cutthroat. There are numerous populations of unique plants, such as threatened plant Maguires primrose, FS sensitive plants Maguires draba, Frank Smith violet, Cache beardtongue, Logan buckwheat, Cronquist daisy, brownie ladyslipper and rare plants Rydberg musineon and Wasatch rockcress. Several of the unique plant species are found in habitats such as on China Wall. Mount Naomi also has rare Whitebark Pine habitat. There are some historical and cultural resources related to the

development of Cache Valley with moderate to high potential for discovery of American Indian sites. The **manageability** of the boundary of the south unit is aided by terrain and few conflicts with outside uses. Boundaries of the northern half are not as easily recognized on the landscape. A private inholding in the north half of the roadless area creates potential for future development.

Need: Mount Naomi roadless area is 10 to 30 miles from Logan, 95 miles from Salt Lake and 60 miles from Pocatello, Idaho. It is adjacent to the existing Mount Naomi Wilderness. The Wellsville Mountain Wilderness is located about 15 miles to the southwest. Opinion on wilderness designation for the area is polarized. The area has been a focal point for public comment, especially from Logan and the Cache Valley during the roadless inventory and analysis process. It has received some of the highest numbers of public comments and is one of the most controversial roadless areas in the region. Some felt the existing wilderness area was sufficient and that previously excluded westside canyons should remain excluded. Others felt these areas should be included to reduce fragmentation of the area. Some felt the south area was a valuable wilderness addition, but did not want the northern portion to become wilderness, because of snowmobile and mountain bike opportunities. Snowmobiling especially in the Franklin Basin and Tony Grove areas is viewed as an important contribution to the local economy.

Alternatives and Potential Environmental Effects to Wilderness Character Roadless Area: Mount Naomi Management Area: Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	40,000	20,300	8,200	0	0	8,200	500
Wilderness Character Protected (acres)[1]	40,600	29,400	8,200	0	0	33,900	33,900
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Temple Peak #0419023

Acres: Gross: 23,400

Location and Access: Area is located east of Logan Canyon Highway 89 about 20 miles northeast of Logan and 3 miles south of the Idaho State line. It can also be accessed by Temple Fork FS road 007, Sinks FS road 055 and Peter Sinks FS road 173.

Setting: Elevations range from 5,500 to over 9,000 feet. Terrain varies from moderate to steep with vegetation consisting of sagebrush, grass, mahogany and maple at lower elevations with aspen and fir at higher elevations.

Availability: Vegetation: There are an estimated 10,000 acres of tentatively suited timber within the area. The area is also used for fuel wood gathering. **Recreation:** Uses include hiking, mountain biking, hunting, fishing, dispersed camping, cross-country skiing, motorized recreation trail use and snowmobiling. Most trails are open to mountain bike use. Both motorized and mechanized recreation use is heavy in the area. Mountain bikers use the Spawn Creek, Little Bear, Turkey, Stump Hollow and Burnt Fork and Great Western trails. Sinks Road is a state groomed snowmobile route. Snowmobile opportunities in the area are considered ideal for families and beginners. The area offers good flyfishing opportunities. **Minerals:** Minerals are federally owned. **Range:** Sheep and cattle graze on portions of six allotments. **Water:** The area

is part of the Logan municipal watershed. **Land uses:** Section 21 is part of a special use permit for the T.W. Daniel Experimental Forest for Utah State University used extensively for teaching, demonstration, and research in natural resources and ecosystem management. It is impacted by old cuttings and roads in the area and includes the already approved Bear Hodges Timber Sale. This section has been removed from the Temple Peak roadless area. **Roads and Trails:** Boundary locations have eliminated most roads from the area. The area includes several trails, some which allow motorized use such as Turkey, Little Bear ATV, and Worm Fence, a segment of the great Western Trail.

Capability: The area is rated moderate in **naturalness of the environment**. Biological and ecological systems are intact though not unique. Motorized use in Stump Hollow and Peters Sink has resulted in resource damage and has detracted from the area's naturalness. **Challenging experiences** can be found but not to the degree they are present in Mount Naomi. **Solitude** is generally low because of heavy recreation use. Opportunities for **primitive recreation** are somewhat limited. **Special Features or Attractions:** Segments of Beaver Creek, Little Bear Creek, Spawn Creek, Temple Fork and Logan River have been found eligible in the wild and scenic river inventory. The area has pleasing scenery but nothing unique. The area has a diversity of wildlife species. The area is part of a critical wildlife corridor and link between the Yellowstone and Uinta Mountain ecosystems. It is important early winter range. Elk utilize the area. Most of the area is lynx linkage habitat. Species at risk that are present include boreal owl, wolverine, goshawk, Bonneville cutthroat trout, three toed woodpecker, spotted bat, big-eared bat, flammulated owl, boreal toad and spotted frog. Bird watching is popular in the area. The rare plant, Wasatch rockcress, is present. The area includes historic Temple Fork Sawmill site. There is moderate potential for additional historic and American Indian sites. **Manageability** is affected by exclusions of nonconforming uses. There are two very large exclusions – Peter Sinks (roads, gravel pit) and Temple Peak (roads, timber sales, state land).

Need: The area is located about 20 miles from Logan. The nearest wilderness area is Mount Naomi about 3 miles to the west. The area has received limited public interest in wilderness designation but has received high opposition primarily because of summer and winter motorized recreation needs as well as mountain biking opportunities.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Temple Peak **Management Area:** Cache-Box Elder							
Alternative:	1	2	3	4	5	6	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	19,900	0	0	0	0	0	0
Trails Closed to Motorized Use From	0	0	0	0	0	0	

Alternatives and Potential Environmental Effects to Wilderness Character Roadless Area: Temple Peak Management Area: Cache-Box Elder							
Alternative:	1	2	3	4	5	6	7
Wilderness Recommendation (miles)							0
Motorized Travel Plan Trails Open (miles)	10.1	10.1	10.1	10.1	10.1	10.1	10.1
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Right Hand Fork Logan #0419028

Acres: Gross: 15,000

Location and Access: Located about 12 miles from Logan, south of Logan Canyon Highway. Access to the area is from Logan canyon highway, and Forest Service roads Right Hand Fork, Cowley Canyon and long Hollow.

Setting: Elevations range from 5,200 feet to 8,000 feet. Much of area is wide valley with open sage meadows, aspen and fir in the upper elevations.

Availability: Vegetation treatment: There are an estimated 5,400 acres of tentatively suited timber within the area. Parts of area have been used for firewood cutting. There is potential for use of prescribed fire to improve habitat. **Recreation:** Mountain biking is very popular. The area also attracts hikers, cross-country skiers, motorcycle trail users, anglers, hunters, and campers. Motorized use on designated trails and snowmobiling use is heavy. **Minerals:** Minerals are federally owned. The area has low potential for oil. **Range:** Cattle graze within the area under permit. Several range improvements are present. **Water:** The area is part of Logan City municipal watershed. **Roads and Trails:** The area contains no roads designated as open in the district travel plan. Two trails, Steel Hollow and Little Cottonwood, allow motorcycle use. There are also non-motorized trails in Ricks Canyon, Willow Creek, Maughan Hollow, and Ephraim's Cutoff. The Great Western Trail passes through the area.

Capability: The area is rated moderate in **naturalness** with high biological and ecological values because of diverse vegetation and habitat types. Its natural appearance is diminished somewhat by the evidence of off-trail use of ATVs. Scenery is rated moderate. **Challenge, solitude** and remoteness are rated moderate. **Special Features or Attractions:** The Logan River and Temple Fork have been found eligible in the wild and scenic river inventory. There is good wildlife habitat, particularly in the area of Chicken Creek. Habitat for mountain lions and winter

range for elk and deer is present. The area is lynx linkage habitat. Species at risk that are present include goshawk, flammulated owl, three toed woodpecker, great gray owl, boreal toad, and Bonneville cutthroat trout. There are several TES plants including the threatened plant Maguire primrose. There is one known heritage resource site and the area has moderate potential for historic and American Indian sites. Because of several nearby sites the area is rated moderate for cultural and historic features. The **manageability** of the area as wilderness is affected by the several road exclusions. This is particularly true for Forest Service road 153 (Chicken Creek) and its intersecting motorized recreation trail that nearly cuts the area in two.

Need: The city of Logan is about 12 miles away. The nearest wilderness area is Mount Naomi located about 2 miles to the northeast. The majority of the comments received on this area have been against wilderness designation. Opponents generally favored the current uses and emphasized motorized and mechanical recreation needs.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Right Hand Fork Logan **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	11,000	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Mount Logan North #0419013
Mount Logan South #0419029
Mount Logan West #0419030

Acres: Gross: North Unit: 19,200
South Unit: 17,000
West Unit: 5,300

Location and Access: Mt. Logan Roadless Area is just east of the communities of Logan, Providence and Millville. Because of developments since the last inventory the area is now split into three distinct units. Logan Canyon Highway 89 forms the northern boundary of the north

unit. Private and state land borders the western edge. Roads in Providence Canyon and Millville Canyon split the units. Blacksmith Highway 101 forms the southern boundary of the south unit. Forest Service road 047 in Cowley Canyon/Herd Canyon forms the eastern edge.

Availability: Vegetation: The north unit has about 4,900 acres, the south unit 6,100 acres and the west unit 1,200 acres of capable and available timber. There is potential for future fuelwood gathering and prescribed fire in this area. **Recreation:** Use includes hiking, horseback riding, fishing, hunting, dispersed camping, mountain biking, motorized trail use and snowmobiling. The area receives very heavy use for snowmobiling and summer motorized use. Mountain biking is takes place on several trails including Card Canyon, Richards Hollow, Richards Elbow, Leatham Hollow and the Great Western. Motorized recreation use takes place on South Fork Millville, Richards Hollow, Richards Elbow, Cart Hollow, Welches Flat, Card Canyon and some other trails. **Minerals:** Minerals are mostly federally owned except for 765 acres in the entire north unit and 252 acres in the south unit. Minerals in the west unit are all federally owned. There are no oil and gas leases. **Range:** The areas include grazing allotments for both cattle and sheep. There are several range improvements present. **Water:** Water is used for Cache Valley communities including Logan City's municipal and irrigation needs. **Land Uses:** A 1985 Forest plan utility corridor follows the southern edge of the south unit. **Roads, and Trails:** There are several non-constructed roads in the units, as well as motorized and non-motorized trails. A few of these short road segments in the north and south units are designated open in the District travel plan. The Great Western Trail traverses the south unit.

Capability: The north unit was rated as moderate in the **naturalness** of its environment with some geological and ecological values present. It is considered quite biologically diverse. Steep and rugged slope areas provide **challenging experiences**. **Remoteness** and **solitude** values are affected by the surrounding development and the popularity of the area. The south and west units are viewed as being less natural than the north unit. **Special Features or Attractions:** Logan Peak is a popular destination. Segments of streams found eligible in the wild and scenic river inventory included Logan River and Left Hand Fork Blacksmith. Plant species at risk present in the northern unit include Maquires primrose, Maquires draba, Frank Smith violet, Cache beardtongue, Hopkins tower-mustard, and Rydberg musineon. The southern unit has a plant species of concern present, Kings woody-aster. The western unit has no known plants species of concern. Scenery throughout the area is typical of similar landscapes with colorful autumn colors. Views of Cache Valley are visible from much of the area. There is important summer and winter habitat for deer, elk, and moose. Other wildlife present includes bobcats, black bear, badger, and raptors including the bald eagle. All 3 units are lynx linkage habitat. The northern unit has Bonneville cutthroat and cutthroat, rainbow and brown trout. The western unit has brown trout while the southern unit has brown trout, cutthroat trout, and whitefish. There are no known heritage resources sites, but Shoshone petroglyph sites exist near the area. Potential is low to moderate for historic and American Indian sites. **Manageability:** There are several intrusions such as an electronic site and rock quarry. The south unit has a significant road and private land exclusions in the White Bedground area on the north side. The west unit is small in

size for wilderness. Private and state land and many roads surround nearly all the units. This may limit access to the area and encourage trespass of non-conforming uses.

Need: The area is six miles from Logan and 90 miles north of Salt Lake City. The nearest wilderness areas are Mount Naomi, one mile to the north and Wellsville Mountains, ten miles to the west. The majority of the public input received was strongly against any wilderness designation for these areas. Many of the motorized routes and snowmobile areas are very important to the local public.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mount Logan North **Management Area:** Cache-Box Elder							
Alternative:	1	2	3	4	5	6	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	6,500	900	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Motorized Travel Plan Roads Open (miles)	4.8	4.8	4.8	4.8	4.8	4.8	4.8

1. Prescriptions 1.5 + 2.4 + 2.6.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mount Logan South **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	15,900	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Motorized Travel Plan Roads Open (miles)	3.3	3.3	3.3	3.3	3.3	3.3	3.3

1. Prescriptions 1.5 + 2.4 + 2.6.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mount Logan West **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	4,500	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Boulder Mountain #0419024

Acres: Gross: 8,800

Location and Access: The area is about 10 miles east of Logan. The best access to it is via the Left Hand Fork FS road 245. It can also be accessed from Dip Hollow FS road 056, Marie Spring FS road 147, Herd Hollow FS road 047 or Mud Spring FS Road 146.

Setting: Terrain varies from moderate to steep. Elevations range from approximately 5800 to 7500 feet. To some the area is known as a "high desert". Vegetation consists of sage grassland in the north with steeper aspen and fir slopes to the south.

Availability: Timber: There are an estimated 3,600 acres of tentatively suited timber within the area. Prescribed burns have been done in the area. **Recreation:** Hunting use is heavy in the area. Though not allowed, the area does receive OHV use. Snowmobiles use the area in the winter. **Minerals:** Minerals are federally owned. A mine was active as recently as 1995 for exploration of gold. It is currently not being operated. **Range:** Sheep grazing is allowed within three allotments. Many range improvements are present. **Water:** The little available water is used for livestock. **Land Uses:** A small seismograph station is operated under permit. **Roads and Trails:** There are no routes designated as open for motorized use within the area; however, there are many user-created roads and ATV routes in the area.

Capability: The **naturalness of the environment** is moderate and provides some **solitude**. It has high values for biological diversity and wildlife habitat. Because much of the area is difficult to access, it is rated moderate for **challenge and primitive recreation opportunities**. **Special Features or Attractions:** The Left Hand Fork of the Blacksmith was found eligible in the wild and scenic river inventory. Scenery values are moderate to high. Important wildlife habitat is provided for elk and deer. The area is lynx linkage habitat. Species at risk that are present include goshawk, flammulated owl, three toed woodpecker, great gray owl, boreal toad, and Bonneville cutthroat trout. Area has some Indian rock art. There is moderate potential for historic and American Indian sites. The **manageability** of the area as wilderness would be difficult. About 50% of the northern boundary is adjacent to private land. Though excluded from the area, Forest road 146 from the northeast to Mud Springs nearly bisects the area in two and would make the area difficult to manage as wilderness.

Need: The area is located about 30 miles from Logan, the nearest population center. The nearest wilderness area is Mount Naomi about 10 miles to the northwest. The area received limited public comment with the majority not favoring wilderness mainly because of motorized recreation needs.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Boulder Mountain **Management Area:** Cache-Box Elder							
Alternative:	1	2	3	4	5	6	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	8,300	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Elk Valley #0419039

Acres: Gross: 8,200

This is a new roadless area in the FEIS that did not appear in the DEIS. It was identified late in the process by the Forest Service.

Location and Access: Area is located on the south east side of the Logan Ranger District in the Wasatch Range, about 15 miles east of Logan and 10 miles southwest of Bear Lake. Most of the access is by going north from Hardware Ranch or south of Highway 89 from Bear Lake Summit on the Sinks to Hardware Ranch Forest Service road.

Setting: Elevations range from 6500 to over 8,000 feet. Much of the area is a wide high elevation valley with upper sage meadows and some aspen and fir pockets in higher elevations.

Availability: Vegetation treatment: Timber sale areas have been excluded from the roadless area, there are some adjacent to the roadless area southwest of Temple Flat. There is some potential for suitable timber in that area. Some locations of the area are also used for fuelwood gathering. The area has potential for prescribed burns to benefit habitat improvement. **Recreation:** The area receives a high amount of summer motorized recreation use for four wheel drive, ATV and motorcycles. There is a severe problem of illegal off-road use in this area. The area also receives dispersed camping and hunting use. In the winter, this area is popular for snowmobiling. The Elk Valley - Sinks road is a State of Utah groomed snowmobile route. Snowmobile opportunities in the area are good for families and beginners. **Minerals:** Most of the area has Federal mineral rights except for the state inholding. **Range:** The area does have

permitted grazing for sheep and cattle on parts of five allotments. **Water:** The area is fairly dry with some scattered springs and intermittent streams. **Roads and Trails:** The area is a critical high use summer and winter motorized and mechanized recreation and dispersed recreation area. The area is networked with roads and trails. Cherry stems have excluded constructed travel plan roads from the inventoried roadless area. The area includes several miles of system trails of which many allow motorized use such as the Elk Valley Divide Trail 2033. Old road remnants and illegally created user roads and trails are found throughout the area. **Fire:** The area has moderate fire potential. **Insect and Disease:** The area has few insect and disease problems.

Capability: The **naturalness of the environment** is low due to livestock trailing and illegal trail and road creation from some recreation users. Geological and educational values of the area are low. Biological and ecological values are moderate. The area offers good wildlife and TES species habitat. The area is lynx linkage habitat. Scenery is common and unspectacular. The potential for **challenging experiences** moderate. **Solitude** is generally low because of heavy dispersed recreation, but because of the area's remoteness, high solitude may be found in portions of the area at some times. Opportunities for **primitive recreation** are somewhat limited because of motorized activities. The high volume of illegal routes detracts from potential Wilderness values. **Manageability** of the area would be difficult due to the several road cherry stems into it. **Special Features or Attractions** include the Ephraim's Grave Grizzly Bear site. There is moderate potential for additional historic and American Indian sites.

Need: The area is a long drive (50 to 60 miles) from Logan. The nearest wilderness area is Mount Naomi about 12 miles to the northwest. The Wellsville Mountain Wilderness is 25 miles to the west. The area has received no public interest in wilderness designation. Many motorized use advocates in the Logan area have voiced substantial opposition to any recommendation for additional Wilderness on the Logan Ranger District. No one realized the area qualified for roadless acreage until late in the process, when the Forest Service identified it.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Elk Valley **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	0	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	5.7	5.7	5.7	5.7	5.7	5.7	5.7

Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Mahogany Range #0419025

Acres: Gross: 11,400

Location and Access: The area is located about 10 miles east of Hyrum. Access is primarily by state highway 101 along the Blacksmith Fork. The Left Hand Fork FS Road 245 along the northern border of the unit is also a key access point.

Setting: The area has an expanse of mahogany, which is very valuable for wildlife habitat. Elevation ranges approximately from 5,100 to 7,500 feet. Much of the area is dry open sage/grass.

Availability: Vegetation treatment: There are an estimated 1,200 acres of tentatively suited timber within the area. Prescribed fire is used to improve wildlife habitat and range suitability. **Recreation:** The area is open in the summer for motorized recreation. Uses include motorized recreation, dispersed camping, hunting, wildlife viewing, some mountain biking, and some hiking. The area is popular for horseback riding and OHV use. The area is closed to snowmobiling. **Minerals:** The minerals are federally owned. **Range:** The area is part of two grazing allotments and there are many range improvements in the area. **Water:** The few natural springs provide water for wildlife and livestock. **Land uses:** A 1985 Forest plan utility corridor crosses the southern portion of the area. **Roads and Trails:** There is one short segment of a low maintenance road, Pig Hole Spring, designated as open on the travel plan. The area has many user-created tracks that are not designated as open. There are non-motorized tails into Hogs Hollow, Pigs Hole and Sow Hole. Motorized access is also used for vegetation treatment as well as by grazing permittees.

Capability: The **naturalness of the area** is rated moderate with high values for biological, ecological and wildlife. Unauthorized motorized use has resulted in resource damage in some areas and detracts from the natural appearance. **Challenging experiences, solitude** and opportunities for primitive recreation are listed as moderate. **Special Features or Attractions:** The unique complex of vegetative types and terrain, as well as being adjacent to the Hardware Ranch Wildlife Management Area provides special wildlife habitat. The area is particularly important in the winter and spring for deer, elk, moose, cougar, and bobcat. Most of the area is lynx linkage habitat. Species at risk that are present include goshawk, flammulated owl, three toed woodpecker, great gray owl, boreal toad, and Bonneville cutthroat trout. There are brown trout, brook trout, and whitefish. The Left Hand Fork of the Blacksmith was found eligible in the wild and scenic river inventory. The area does have sites of Shoshone Indian rock art. There is low to moderate potential for other historic and American Indian sites. The **manageability** of

the area as wilderness would be hindered because the boundaries are along roads. Surrounding state and private land contribute to the complexity.

Need: The area is about 20 miles from Logan, the nearest major population center. The nearest wilderness area is Mount Naomi about 10 miles to the north. The area received limited public comment, but the majority of those did not favor wilderness designation. The area could add an ecosystem type that is currently not common in our wilderness areas.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mahogany Range **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	6,300		0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Mollens Hollow #0419015

Acres: Gross: 17,700

Location and Access: The area is 3 miles east of Hardware Ranch in Cache County. Access is via Forest Service road 059 Curtis Creek.

Setting: Steep slopes characterize canyons while the terrain is more rolling in other areas. Elevations range from 6,000 feet to 8,600 feet. The area has a sinkhole where a stream disappears. The area has the largest stand of pinyon pine on the Cache portion of the Forest. Fir, spruce and aspen characterize north and east slopes. Mountain mahogany, maple, snowberry and juniper are found on the southern and western exposures.

Availability: Vegetation Treatment: There are 6,700 acres of tentatively suited timber within the area. Select trees with insect problems were removed as recently as 1998. Prescribed fire has been used for habitat improvement and aspen regeneration. **Recreation:** Recreation use is generally light. There is some hiking, horseback riding, and hunting. Tilda Springs is a popular ATV trail network. The State of Utah is interested in providing additional trails in partnership

with the Forest. The area receives heavy snowmobile use and parts of it are known as a snowmobile play area. **Minerals:** About 800 acres have private mineral rights. The area has some potential for oil and gas. **Range:** Sheep and cattle graze the area. There are many range improvements. **Water:** There are no formal culinary water uses. **Land Uses:** A 1985 Plan utility corridor crosses the northwest corner. **Roads and Trails:** There are no constructed roads present. Tilda Springs is a network of ATV trails. There are a few low maintenance non-motorized trails.

Capability: The **naturalness of the environment** is fair. Past overgrazing and user created ATV routes have compromised its natural appearance. Mollens Hollow RNA offers intact ecological and biological systems and provides research opportunities. Opportunities for **solitude** and **primitive recreation** are somewhat limited. **Special Features or Attractions:** The area includes the 1,186 acre Mollens Hollow Research Natural Area (RNA). The area does offer some unique scenery. Important fall and winter range for deer and elk. Most of the area is lynx linkage habitat. The area has potential to support cutthroat trout, but its presence has not been verified. Cache beardtongue and Logan buckwheat, two sensitive plants, are present. There is one known heritage resource site. The area has moderate potential for the presence of historic and American Indian sites. **Manageability** is affected by the open terrain, which makes it difficult to manage motorized use. There are several roads that have been excluded by cherry stems that access the area.

Need: The area is about 85 miles from Salt Lake, 25 miles from Logan and 45 miles from Ogden. Mount Naomi and the Wellsville Mountains are the nearest wilderness areas. Interest in the area has generally been limited. A few felt that it was a good example of what a mid elevation wilderness could be, which is not common in Northern Utah.

Alternatives and Potential Environmental Effects to Wilderness Character
Roadless Area: Mollens Hollow
Management Area: Cache-Box Elder

Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	17,400	17,200	1,200	1,200	1,200	1,200	1,200
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Wellsville Mountains #0419014

Acres: Gross: 1,800

Location and Access: The Wellsville Mountains are located just north of Brigham City and west of Hyrum and Logan. Access to the Wellsville Mountains is somewhat limited, especially on the west side because of private lands. Deep Canyon and Maple Bench in the northeast quadrant of the range are the key recreation access points. Highway 89 to Logan briefly crosses the Forest by Wellsville Canyon. The roadless area is composed of several different units all of which are contiguous with the Wellsville Wilderness.

Setting: Much of the remaining roadless area is lower elevation country 4,500 to 6,000 feet and primarily grassland with scattered patches of rock and trees.

Availability: Vegetation treatment: There is no tentatively suited timber within the area. **Recreation:** Primarily uses of these areas are hiking, horseback riding, hunting, bird watching, a few mountain bike opportunities and some winter recreation including snowmobiles, snowshoers and cross-country skiers. There are possible opportunities for additional recreation development at Deep Canyon and Maple Bench. **Minerals:** Almost all of the minerals are federally owned. The area has low potential for oil and gas and some potential for uranium and geothermal activities. The west side also has some potential for gravel pits development. **Range:** Cattle under permit graze most of the area. Range improvements are present. **Water:** Much of the area is an important municipal watershed for local communities. **Land uses:** All but one of the parcels have water developments for local communities. A utility corridor from the 1985 Plan crosses the western edge of a few of the units. **Roads and Trails:** There are no roads or motorized trails designated as open. There may be a few user-created roads.

Capability: The area is rated moderate for **naturalness of the environment** and ecological values. The current areas of roadless have less wilderness character than the existing wilderness. Opportunities for **solitude** are high because of the low use the area receives and limited access. There are opportunities for **primitive recreation** and challenging experiences. **Special Features or Attractions:** Raptor populations and fall migration routes are important. There is habitat for endangered peregrine falcon. Much of area is essential habitat for deer winter range. The area has been identified as potential habitat for bighorn sheep. There are some significant archaeological sites in the mountain range from the Shoshone tribe. There is low potential for historic sites. **Manageability:** There are few identifiable features to aid in boundary location.

Need: Most of the Wellsville Mountains is already designated wilderness. The area is about 15 miles from Logan and about 70 miles from Salt Lake. Very little public support for wilderness additions to the existing wilderness has been voiced.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Wellsville Mountains **Management Area:** Cache-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	1,700	40	40	0	0	40	40
Wilderness Character Protected (acres)[1]	1,700	40	40	0	0	40	40
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Bear Management Area

Name: Swan Creek Mountain #0419001

Acres: Gross: 9,400

Location and Access: The Swan Creek Inventoried Roadless Area (IRA) straddles the Idaho/Utah border about 3 miles west of Bear Lake. It is shared with the Caribou National Forest though this report refers only to the Utah portion. It is located in Rich and Cache Counties. Logan Canyon Highway 89 is the southern boundary, Beaver Creek Road 011 is the western boundary, the state line is the northern boundary and the Forest boundary is the eastern boundary. The Swan Flat Road 014 splits the Utah portion into two areas. Access to the area is via Swan Flat, Beaver Creek and Logan Canyon Highway roads.

Setting: The topography is generally steep, but is rolling and gentle in some places. Elevation ranges from 7,400 to 9,082 feet. Vegetation consists primarily of sagebrush, grass, mahogany, and maple at lower elevations and aspen and fir at higher elevations.

Availability: Vegetation treatment: There are an estimated 3,500 acres of tentatively suited timber within the area. The area has potential for fuel treatment needs. **Recreation:** Hunting, hiking, snowmobiling, cross-country skiing are popular recreation uses. The area is well suited for beginner and family snowmobile opportunities and has a highly used backcountry ski area (Garden City Canyon). New developments in Bear Lake Area have increased use in the area. **Minerals:** Minerals are mostly federally owned except for around 300 acres of State-owned minerals. There are no oil and gas leases within the area. **Range:** Sheep grazing is allowed under permit. **Water use:** The area is within Logan City Municipal watershed. **Land uses:** A fiber optic line traverses the southern boundary. A snowmobile rental and guide service operates under permit in the area and also guides horseback trips in the summer. **Roads and Trails:** There are no routes designated as open for motorized use within the area; however, there are many user-created roads and ATV routes in the area.

Capability: The **naturalness of the environment** is low to moderate. The **natural appearance** of the area is highly impacted by the appearance of management activities and facilities. The area provides limited **challenge, solitude** and remoteness because of its small size and the presence of the Swan Flat Road. Opportunities for **primitive recreation** are average. **Special Features or Attractions:** The area is important year-round range for deer and summer range for elk and a few moose. Lynx linkage habitat is present. The area generally provides good habitat for wildlife and sensitive species. A portion is adjacent to a state Wildlife Management Area. Beaver Creek drainage has Bonneville cutthroat trout present. One known heritage site is present with moderate potential for discovery of other historic and American Indian sites. Scenic features are moderate. Bear Lake is visible from numerous vantage points.

The **manageability** of the area as wilderness would be difficult because of the Swan Flat Road exclusion.

Need: The area does not significantly contribute to the distribution of wilderness in Northern Utah, is not a unique landform, limited in primitive non-motorized recreation opportunities and limited in the ability to contribute to research. The area has received limited interest by the public, other groups and agencies for wilderness designation. The nearest wilderness is Mount Naomi about 7 miles away to the west. The area is 20 miles from Logan and 100 miles from Salt Lake.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Swan Creek **Management Area:** Bear							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	19,900	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Rock Creek—Green Fork #0419034

Acres: Gross: 5,600

Location and Access: Area is about 7 miles east of Hardware Ranch straddling the Cache and Rich County lines. It is also about 8 miles west of the community of Randolph. Access is primarily from forest roads out of Elk Valley and Curtis Creek or via private and BLM roads leaving Randolph.

Setting: Rounded mountain terrain with predominately east-west drainage patterns characterizes the landscape. The forest is a mix of lodgepole pine, Douglas fir, sub-alpine fir and Englemann spruce. Lower elevations have chokecherry, serviceberry, mountain mahogany and sagebrush.

Availability: Vegetation Treatment: There are an estimated 2,700 acres of tentatively suited timber within the area. An adjacent section owned by the State of Utah has had extensive timber harvesting. The area is also used for fuel wood gathering. Prescribed fire has been used for aspen treatments and fuel reduction. **Recreation:** The area receives limited recreation use; primarily

hunting, hiking and horse riding. There is some snowmobiling and some mountain bike use in the area. Access from Old Canyon road along the southern boundary of this area has a large amount of dispersed camping especially during the hunting season. **Minerals:** Minerals are most federally owned, but approximately 300 acres are private or state owned. **Range:** Sheep and cattle graze throughout the area in parts of four allotments. The area contains several range improvements. **Water:** Blacksmith Fork, which originates in the area, provides irrigation water. **Land Uses:** A 1985 plan utility corridor crosses much of the northern portion. **Roads and Trails:** The area contains no system roads. There are no routes designated as open for motorized use within the area; however, there are many unauthorized roads and ATV routes in the area. Road number 26981 is used to access a private forty-acre parcel within this area. There is a trail going up Rock Creek.

Capability: The **naturalness of the environment** is low. Evidence of human activity is present. The area has little wilderness character. Opportunities for **solitude** and **challenging experiences** are low. **Special Features or Attractions:** Locally significant small caves are located near the southern boundary. Goshawk, Coopers hawk and other raptors inhabit this area. Rock Creek has Bonneville cutthroat trout. The area is lynx linkage habitat. It is important for big game summer range. There are no known heritage resource sites, but there is moderate to high potential for historic and American Indian sites. The shape of the area presents difficulty in **manageability**. Without acquisition of state land, the area is very narrow with less than ¼ mile between old timber sales the state land in section 32.

Need: Because of manageability difficulties, this area has limited value as wilderness. No public interest on this area as wilderness has been received.

Alternatives and Potential Environmental Effects to Wilderness Characteristics **Roadless Area:** Rock Creek - Green Fork **Management Area:** Bear							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	2,940	2,940	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Sugar Pine #0419031

Acres: Gross: 5,600

Location and Access: The area is located in the Monte Cristo area, just east of Monte Cristo Campground. Most of the access to the area is via Highway 39.

Setting: Elevations range from 7,600 to 8,900 feet. Key vegetation habitat consists of spruce, fir and Douglas fir forest, aspen and grass. The drier, south facing hillsides have a sagebrush and grass community.

Availability: Vegetation Treatment: There are an estimated 3,600 acres of tentatively suited timber within the area. Prescribed burning has been used to improve wildlife habitat. **Recreation:** The area receives limited recreation use, primarily hiking, mountain biking, horse riding, fishing, and hunting. There is snowmobile use adjacent to Highway 39. **Minerals:** Minerals are federally owned except for about 60 acres of privately owned minerals. **Range:** Cattle graze under permit throughout the area. Numerous constructed range improvements such as stock ponds, troughs, pipelines, spring developments, water systems, and fences are present. **Water:** Sugar Pine Creek and its tributaries are used primarily for agricultural uses. **Land Uses:** A 1985 Forest Plan utility corridor crosses much of the southern end of the roadless area. **Roads and Trails:** The area has no system roads nor system recreation trails; however, there are many user-created routes present.

Capability: The **naturalness of the area** is low because of the many range improvements present and the many user-created roads. The area is moderate in geological, ecological and biological values. Nothing is unique about the area. There are limestone sinks in the Cave Ridge area. Evidence of human presence on the landscape detracts from the opportunities for **solitude. Challenging experiences** and **primitive recreation** opportunities are low. **Special Features or Attractions:** Sugar Pine Creek has Bonneville cutthroat trout. The area may have goshawk and boreal toad habitat. Lynx linkage habitat is present. There is summer range for elk, deer, and moose. There is an historic mill site along Sugar Pine Creek and some old CCC spring developments are present. The area has moderate potential for historic and American Indian sites. The **manageability** of this area as wilderness is very limited. The northern and eastern boundaries are adjacent to private land and could increase the complexity for managing the area as wilderness.

Need: The area would not contribute to the national wilderness system; it is a small isolated primarily range area, located quite a distance from the Wasatch front. No public comments have been received promoting this area as wilderness. The area does provide for some primitive recreation such as hunting outside the wilderness.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Sugar Pine **Management Area:** Bear							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	4,888	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

North Wasatch-Ogden Valley Management Area

Name: Upper South Fork #0419018

Acres: Gross: 17,300

Location and Access: The area lies 25 miles east of Ogden and due east of the South Fork of the Ogden River. Access is via Forest Service road 039 to Causey Reservoir and Highway 39 at the north end near Monte Cristo.

Setting: Elevations range from 5,700 feet to about 8,000 feet. Rounded ridge tops and very steep drainages with sheer cliffs characterize the area's topography. South and west slope vegetation typically includes mountain mahogany, serviceberry, Gambel oak, sagebrush and grass, while on north and east slopes there is fir, spruce, maple, snowberry and chokecherry. Cottonwood is present in the riparian habitats.

Availability: Vegetation treatment: There are an estimated 4,800 acres of tentatively suited timber within the area. Prescribed burning has been used for habitat improvement and aspen regeneration. There is a partnership with Deseret Land and Livestock on the east side for prescribed burning. **Recreation:** The area is popular as undeveloped backcountry. Most of area is closed to motorized recreation and snowmobiling, though there is some limited snowmobiling on north end. Primary uses include hiking, horseback riding, backpacking, fishing and hunting. Day hiking is popular from Causey Reservoir, as well as hunting by foot or horseback. Mountain bikes use the Bluebell Flat area. **Minerals:** About 50% of the minerals in the area are privately owned. The area has had some minor mining historically. The area has low potential for oil and gas. **Range:** Sheep graze under permit in the north end. There are some range improvements. **Water:** Water from the area contributes to Ogden City's water supply, though most of the headwaters are on private land. **Land Uses:** There is a snow-monitoring site operated by the Natural Resource Conservation Service in the Bluebell Flat area. **Roads and Trails:** No system roads are present. There are non-motorized trails in Wheatgrass Canyon, and in the Bear Hollow, Baldy Ridge, and Cabin Hollow areas.

Capability: The **naturalness of the area** is outstanding with little evidence of human intrusion except near Causey Reservoir. The scenic quality is enhanced by highly varied vegetation and geologic patterns. There are several canyons and caves. Geological, biological, ecological and wildlife values are rated moderate to high. Opportunities for **solitude** are high. The area receives low to moderate use. The area provides excellent opportunities for **primitive recreation**. The rugged and wild terrain provides visitors with **challenging experiences**. **Special Features or Attractions:** The Left Fork of the South Fork of the Ogden River was found eligible in the wild and scenic river inventory. The area is an important winter range for deer, elk and moose. Little survey work has been completed in this area for species at risk. Small animals and birds including raptors are common. The area has a cave inhabited by Townsend big-ear bats. Bonneville cutthroat trout are present as is a healthy rainbow trout fishery. Kokanee salmon

migrating from Causey Reservoir spawn in creeks in the area. *The area* is lynx linkage habitat. The area has no known heritage sites, but has moderate potential for discovery of historic and American Indian sites. **Manageability** as wilderness is affected by being surrounded on 3 sides by private land and having 50% of the minerals are privately owned. These create the potential for future non-conforming uses in and around the area. The area is long and narrow and in some places down to one mile wide. Forest Service road 201, Bluebell Flat road, has been excluded.

Need: The area is located about 20 miles away from Ogden. Salt Lake City is about 70 miles away. The area is a fair distance from the nearest wilderness areas, with Mount Naomi 50 miles to the north and Mount Olympus 60 miles to the south. Some feel there is a need for a designated wilderness in the Ogden vicinity. Interest in the area has been moderate with little opposition for wilderness designation. The area represents an ecosystem type that is not common compared to the other higher elevation wilderness areas on the Forest.

Alternatives and Potential Environmental Effects to Wilderness Characteristics **Roadless Area:** Upper South Fork **Management Area:** North Wasatch-Ogden							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	17,200	0	17,200	0	0	14,400	14,200
Wilderness Character Protected (acres)[1]	17,200	15,100	17,200	0	0	14,400	14,200
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Willard #0419016

Acres: Gross: 19,100

Location and Access: The area lies on the western slope of the Wasatch Range between North Ogden and Brigham City. Private lands surrounding most of the area limit and restrict much of the access.

Setting: The area is steep and rugged and dominated by peaks such as Chilly, Ben Lomond, Willard and Grizzly. Elevation ranges from approximately 5,500 feet to 9,764 feet. The vegetation varies from grass and oak brush in the lower elevations, aspen and maple in the mid-

slopes, to patches of fir and alpine in the high country. Rock outcroppings and cliffs intermingle between the vegetation.

Availability: Vegetation Treatment: There are an estimated 3,100 acres of tentatively suited timber within the area. **Recreation:** Ben Lomond is a popular hike. Motorcycles and mountain bikes use the Wasatch Crest Trail (part of Great Western Trail). Some snowmobile use occurs on the eastern slopes. **Minerals:** The majority, approximately 75%, of minerals is privately owned. A few acres of state mineral rights are present. The area has had historic mining, but currently there are no active claims. **Range:** The area has no grazing allotments. **Water:** The area is an important watershed to local communities. **Land Uses:** A snow-monitoring site operated by the Natural Resource Conservation Service is located on Ben Lomond Peak. A 1985 Forest Plan utility corridor crosses the western and southern edges of the roadless area. Avalanche control work is done at North Ogden Divide. **Roads and Trails:** Wasatch Crest Trail allows for motorized use. Two short segments of roads allowing motorized use are present: Grizzly Peak (FS20092) and Duck Flat (FS26010). There are many user-created roads and ATV routes in the area.

Capability: The **naturalness of the environment** area is rated moderate. There is some evidence of human activity with several areas of old watershed terracing present (462 acres). Most are not substantially noticeable. **Solitude** is moderate since the Willard Basin Road nearly dissects the area. Noise from avalanche control work detracts from the sense of remoteness in the winter. **Challenging experiences** are present because the terrain is wild and steep. **Primitive unconfined recreation** opportunities are limited. **Special Features or Attractions:** The area has big game winter and summer range. Prime habitat for raptors is present including a significant bald eagle roost area. Mountain goats have been introduced to the area. Several populations of sensitive and rare plants are present including Burkes draba, Utah ivesia, Wasatch fitweed and Wasatch rockcress. Willard Creek was found eligible to be in the Wild and Scenic River inventory for its outstanding geological values. Outstanding vistas can be seen from Ben Lomond Peak. The area contains a CCC camp and evidence of their work is present in Willard Basin. **Manageability** as wilderness is hampered since most of the area is surrounded by private or state land and has eight different parcels of private and state inholdings.

Need: The area is between wilderness areas to the north (Wellsville Mountains, Mt Naomi) and to the south (Mt Olympus, Twin Peaks, Lone Peak). Much of the area is similar to these wilderness areas, very little uniqueness and would not add much to the wilderness system. The area is valuable for providing recreation that is not dependent on the wilderness resource.

Alternatives and Potential Environmental Effects to Wilderness Characteristics Roadless Area: Willard Management Area: North Wasatch-Box Elder							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	8,300	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	18,800	18,400	0	0	0	0	11,400
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	6.0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	2.0	8.0	8.0	8.0	8.0	8.0	8.0
Motorized Travel Plan Roads Open (miles)	0.6	0.6	0.6	0.6	0.6	0.6	0.6

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Lewis Peak #0419017

Acres: Gross: 12,100

Location and Access: The area is located in the Wasatch Range east of the cities of Ogden and North Ogden. Access to the area is via North Ogden Canyon road.

Setting: Elevations range from 4,599 feet on the western boundary to 8,031 feet on Lewis Peak. South and west slopes are vegetated with Gambels oak, mountain mahogany, juniper, sagebrush and grass. Maple, fir, aspen, chokecherry and mountain ash characterize north and east slopes.

Availability: Vegetation Treatment: There are an estimated 300 acres of tentatively suited timber within the area. Prescribed burning has been used for wildlife habitat improvements and fuels reduction improvements. **Recreation:** Use includes hiking, horseback riding, motorcycle riding, winter non-motorized recreation, hunting and rock climbing. The area may receive a little snowmobiling use on the east side. Several of the trails are motorized and receive heavy motorcycle use. The area has been the focus of recent partnership with State of Utah for making trail improvements. These trails are some of the few system motorized trail opportunities on the Ogden District. The Wasatch Crest Trail, part of the Great Western Trail, traverses the area. There are several user-created trails in side canyons near the urban Wasatch Front. The area is being considered for possible location of the Bonneville Shoreline Trail. **Minerals:** The majority, approximately 75%, of minerals is privately owned. There is low oil and gas potential and no leases present. **Range:** The area has no permitted livestock. **Water:** The area is a municipal watershed for Ogden and North Ogden cities. The east side is an important watershed

for Pineview Reservoir. **Land Uses:** Utility corridors are present in Ogden and North Ogden Canyons and along the Wasatch Front. North Ogden City has a water system in Coldwater Canyon which needs maintenance access. There are other small water lines present. Nordic Valley Ski Area expansion that would expand into the area has been proposed. **Roads and Trails:** The area contains no roads. Most of the trails in the area are open (Wasatch Crest 2001, City View 2040 and Lewis Peak 2041) for motorcycle use. **Fire:** Proximity to Ogden City has caused a high occurrence of fires in the past. **Insect and Disease:** There are few insect and disease problems.

Capability: The areas **naturalness of the environment** is excellent. It is rated moderate for geological, biological and ecological values. Development at Pineview Reservoir, Nordic Valley Ski Area and along the Wasatch Front is visible. Opportunities for **solitude** are somewhat limited, due to inadequate vegetation screening and topography and being within the sights and sounds of the city. **Challenging** experiences and primitive recreation opportunities are excellent, due to its wild, rugged terrain along the Wasatch Front with steep canyons and rock cliffs. There are flat meadows on top allowing for recreation use on trails. **Special Features and Attractions:** The area is rated moderate for wildlife and TES habitat. The area has habitat for peregrine falcon and other raptors. The west side serves as important deer winter range. There are also elk, moose and various small animals and birds in the area. The area has rare plant, broadleaf beardtongue present. Scenic values are above average. There are no known heritage resources sites. The area has moderate potential for historic and American Indian sites. **Manageability:** Most the area is surrounded by private land. The extent of private mineral ownership also hampers potential manageability as wilderness.

Need: The area is adjacent to the city of Ogden. The nearest wilderness is the Wellsville Mountains, about 20 miles to the north and Mount Olympus, about 45 miles to the south. The area has received limited public comments on recommending the area for wilderness. The ecosystem types are represented in other existing wilderness areas.

Alternatives and Potential Environmental Effects to Wilderness Characteristics
Roadless Area: Lewis Peak
Management Area: North Wasatch-Ogden

Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	12,100	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	12,100	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	16.5	0	0	0	0	0	0

Motorized Travel Plan Trails Open (miles)	0	16.5	16.5	16.5	16.5	16.5	16.5
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Burch Creek #0419019

Acres: Gross: 6,900

Location and Access: The area is located in the Wasatch Range just east of the towns of Ogden, South Ogden and Uintah. Access is from the Wasatch Front, Interstate 84 and State Highway 226 to Snow Basin Ski Area.

Setting: The country is steep with varied geologic and vegetation patterns. South and west slope vegetation typically includes mountain mahogany, serviceberry, Gambel oak, sagebrush and grass. Douglas fir, subalpine fir, Englemann spruce, maple, snowberry and chokecherry are found on the north and east slopes. Elevations range from 4,500 feet to 9,572 foot Mount Ogden.

Availability: Vegetation treatment: There are an estimated 100 acres of tentatively suited timber within the area. Prescribed fire has been used for wildlife habitat manipulation. **Recreation:** Use includes day hiking, some backpacking, mountain biking, non-motorized winter recreation and hunting. Ski area development along the ridgeline is directly adjacent to the area. **Minerals:** The majority, approximately 65%, of minerals is privately owned. There is no known mineral potential or current activity. The area is not leased for oil and gas. **Range:** There are no permitted livestock. **Water:** The area is a valuable municipal watershed to Ogden and Uintah cities. **Land Uses:** The feasibility of a tram from Weber State University to Strawberry Peak has been studied though is not currently being considered. A 1985 Forest plan utility corridor crosses the southern portion above Interstate 84. Mount Ogden, directly adjacent to the area, has a communication site, which can require helicopter landings. **Roads and Trails:** The Beus Canyon Trail, ascending Mount Ogden, is part of the Great Western Trail system. An additional length of the Great Western Trail is proposed in the upper ridgeline area from Strawberry Peak to Ogden Canyon. A portion of the Bonneville Shoreline Trail, which allows mountain bikes, has been completed between Beus and Strong Canyons near the urban interface. **Fire:** Fire occurrence and danger is high near Ogden City and in Weber Canyon. High value homes are located not far from the area. **Insect and Disease:** There is no disease or insect infestation**.**

Capability: A mostly **natural environment** is present. In some locations in the roadless area, a visitor's sense of **solitude** is diminished from the sights and sounds of nearby development. It is moderate for providing biological and wildlife values. Opportunities for **primitive recreation** are moderate, limited somewhat by the size of the area and screening from vegetation. The area provides a unique, unconfined experience for urban users in the Ogden area. The rocky, steep,

rugged terrain provides **challenging experiences**. **Special Features or Attractions:** Peregrine falcon habitat exists. Lower Weber Canyon is important deer and moose winter range. A variety of small birds and mammals exist. Burch Creek has rainbow trout. There is a Forest Service sensitive plant, *Burkes draba* present. The area has one known heritage site and moderate potential for historic and American Indian sites. **Manageability** of the area as wilderness is somewhat hindered given it is surrounded by urban development, private land and is adjacent to the Snowbasin Ski area.

Need: The area is located adjacent to south Ogden. The nearest wilderness area is Mount Olympus, about 40 miles to the south. Much of the area is very similar to other Wasatch front wilderness areas. The area received few public comments, although there is high interest in the area because of nearby Olympic developments and the proposed tram.

Alternatives and Potential Environmental Effects toWilderness Character **Roadless Area:** Burch Creek **Management Area:** North Wasatch-Ogden							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	6,900	0	0	0	0	0	0
Roadless/Wilderness Character Protected (acres)[1]	6,900	6,900	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Francis #0419010

Acres: Gross: 14,800

Between the Draft and Final EIS, it was decided to combine the North Francis Roadless Area with what had been called the Middle Francis and South Francis Roadless Areas for the purposes of consideration for Wilderness. In the DEIS the Middle (3,294 acres) and South Francis (3,372 acres) had been considered too small to meet minimum size criteria for roadless (5,000 acres). Upon further examination the interdisciplinary team determined that the cultural barriers (minor powerlines and blocks of private lands of similar roadless character) which had been considered area separators during preparation of the DEIS did not significantly interrupt the predominantly undeveloped nature of this landscape and that the Middle and South areas should be combined with North Francis. The nature of the combined roadless area is described below.

Location and Access: The area lies mostly on the western slope of the Wasatch Range east of Layton, south of Interstate 84, north of Farmington Canyon Road, and west of Francis Peak Road. Trails from Fernwood Picnic Area, Adams Canyon and the Great Western trail segment from Francis Peak Radar Station can access area.

Setting: The topography is steep and rugged, with elevations ranging from 4,500 feet near the valley to 9,707 feet at Thurston Peak. Drainages such as Hobbs Canyon, Adams Canyon, Bair Canyon, and Shepard Creek cut through the area. Vegetation at lower elevations consists of Gambels oak, maple and grasses. Aspen and fir grow in patches on higher slopes, along with a few remnants of whitebark pine. The Great Salt Lake Valley, Antelope Island, Weber River Valley and Morgan Valley are visible from many vantage points.

Availability: Vegetation treatment: There are 140 acres of tentatively suited timber within the area. **Recreation:** Use includes hiking, horseback riding, mountain biking, hunting and some winter recreation activities. A popular hike is from the Francis Peak Federal Aviation radar facility in the south along the Great Western Trail to the top of 9,707 foot Thurston Peak. This portion of the trail also receives some mountain bike use. The Great Western Trail also receives use out of Fernwood Picnic Area. Adams Canyon is another recreation trail with a trailhead on the Wasatch Front. Portions of the Bonneville Shoreline Trail near Fernwood currently exist or are being planned. Other canyons such as Hobbs Canyon also receive some dispersed recreation use. **Minerals:** The majority of minerals, about 2/3, are privately owned. **Range:** Sheep graze under permit on the Morgan County portion. **Water:** The area serves as municipal watershed for local communities. **Land Uses:** A portion of the area is within the permitted area for heliskiing. A 1985 Forest plan utility corridor crosses the western portion of the area. **Roads and Trails:** The area contains no roads, but has some recreation trails.

Capability: The **naturalness of the environment** remains intact with little influence of human activities. The southern portions of the area are more human influenced than in the north due to the presence of the adjacent roads and facilities in Farmington Canyon and along the road to Francis Peak. Opportunities for **solitude** and **challenging experiences** are generally good though in a few locations in the roadless area, a visitor's sense of **solitude** is diminished from the sights and sounds of nearby development. **Special Features or Attractions:** Thurston Peak is the highest point in Davis County. There is habitat for peregrine falcon and bald eagle. Summer and winter range are present for deer, elk and few moose along with the usual variety of small birds and animals. The area has some of the most remote and spectacular scenic vistas from the ridgeline in Davis County. The area has moderate potential for discovery of heritage sites of historic water control, logging, and American Indian sites. **Manageability** is generally good in the northern section, but decreases as one moves toward the south. Private land surrounds much of the area.

Need: The area is located adjacent to the Davis County communities of Fruit Heights, Kaysville and Layton. The nearest wilderness area is Mount Olympus, about 30 miles to the south. Much

of the ecosystem types of the area are represented in other wilderness areas. The area received limited public comment on its wilderness potential.

Alternatives and Potential Environmental Effects to Wilderness Character Roadless Area: Francis Management Area: North Wasatch-Ogden							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	8,100	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	14,300	14,300	0	0	0	4,800	4,800
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.[1]

Name: Farmington #0419009

Acres: Gross: 10,900

Location and Access: It is situated on the western slope of the Wasatch Range northeast of Bountiful in Davis County. The area is bordered by improved roads on three sides: Ward Canyon Road on the south, Skyline Drive along the eastern edge at the mountain crest, and Farmington Canyon Road on the north. Along the western side is the urban Wasatch Front.

Setting: The topography is steep and rugged with elevations ranging from 4,500 feet at the base to over 9,000 feet near the Skyline Road. Sagebrush, gambel oak, and maple vegetate the lower elevation slopes. Aspen and fir are found at higher elevations. The ridge near Skyline Drive is windswept and much of it consists of grass, rock and pockets of shrubs and trees including aspen and subalpine fir.

Availability: Timber: There are an estimated 1,000 acres of tentatively suited timber within the area. **Recreation:** Use is primarily day hiking with increasing dispersed camping. There are non-motorized winter recreation activities such as cross-country skiing, snowshoeing and snowboarding. Snowmobiles access portions of the area especially near Skyline Drive and along Farmington and Ward Canyon Roads. The area receives heavy hunting use and has some limited fishing opportunities. **Minerals:** The majority of minerals, approximately 60%, are privately owned. **Range:** Some sheep grazing is permitted in the area. **Water:** The area is valuable municipal watershed for the surrounding communities. A portion of the Davis County

Experimental Watershed is within the area. **Land uses:** Part of this area is currently under permit for guided helicopter skiing opportunities. A utility corridor from the 1985 Forest Plan crosses some of the area as does the Davis Aqueduct. **Roads and Trails:** There are no roads except for a few remnants. There are no routes designated as open for motorized use within the area; however, there are many unauthorized roads and ATV routes in the area, particularly near the urban interface and off the main roads surrounding the area. Recreation trails exist in Parrish Creek and Farmington Canyon. There are a few trails up other canyons such as Rick's Creek and Steed Canyon. The proposed Bonneville Shoreline Trail could cross portions of the area along its western boundary.

Capability: The **naturalness of the environment** and appearance of the area is good, but generally wilderness characteristics are lacking. Extensive areas of terracing completed for watershed improvement are visible along the Skyline Drive just outside the area. Its evidence varies by location, season and lighting. A small area of terracing is within the roadless area itself. This element of human alteration of the landscape can affect one's sense of remoteness. In some locations in the roadless area, a visitor's sense of **solitude** is diminished from the sights and sounds of nearby development. **Challenging** experiences **and primitive recreation** are somewhat limited. **Special Features or Attractions:** The roadless area contains the 167 acre Morris Creek Research Natural Area (RNA), which was set aside as a benchmark area that was not impacted from past grazing. The area contains habitat for Peregrine falcon and goshawk. The area is important summer and winter range for deer, elk, moose and small game. Near the Skyline Drive, are ponds called Farmington Lakes, which have habitat for beaver, ducks, and dragonflies. There are no known heritage sites, but some prehistoric rock art has been found near the area. The area has moderate potential for discovery of historic logging, water control, recreation, and American Indian sites. **Manageability** of the boundary would be fair primarily because the development along the Front and the popularity of Skyline Drive. There is one intrusion of narrow private land on the south end.

Need: The area is within 15 to 20 miles of Salt Lake City adjacent to the South Davis communities of Centerville and Farmington. The nearest wilderness area is about 20 miles to the south (Mount Olympus). Public interest in the area as wilderness has been low.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Farmington **Management Area:** North Wasatch-Ogden							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	1,200	1,200	200	200	200	1,200	1,200
Trails Closed to Motorized Use From Wilderness	0	0	0	0	0	0	0

Recommendation (miles)							
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.[1]

Name: Hogsback #0419026

Acres: Gross: 7,900

Location and Access: The area is on the eastern slope of the Wasatch Range in Morgan County 5 miles east of Farmington and 7 miles southwest of Morgan. Primary access is by Skyline Drive and a segment of the Great Western Trail near Bountiful or Farmington. The Farmington Flats road that leaves Skyline Drive also reaches the area.

Setting: Much of the area is steep and rugged. The area is known for its ridgeline shaped like a "hog's back" in the distance. This ridge is primarily grass, rock and scattered patches of shrubs. Elevation for the area ranges from approximately 7,000 feet to 9,259-foot Bountiful Peak. Vegetation consists of grass, sage, and patches of shrubs, aspen and conifer. The ridge near Skyline Drive is windswept with rock outcroppings and remnants of a few whitebark pines.

Availability: Vegetation Treatment: There are an estimated 2,300 acres of tentatively suited timber within the area. **Recreation:** The primary recreation use is hunting. There is some day hiking, dispersed camping, snowmobiling and OHV use. **Minerals:** Half of the minerals are privately owned. **Range:** Sheep grazing is permitted in much of the area. **Water:** The area provides water for communities in Morgan Valley. **Land Uses:** A 1985 plan utility corridor crosses the southern boundary. A portion of the area is within the permitted area for heliskiiing. **Roads and Trails:** There are three lightly used trails (Wasatch Crest, Arthur's Fork and Deep Creek).

Capability: The **naturalness of the environment** is moderate. Areas that have been terraced for watershed improvement are visible along the Skyline Drive and Farmington Flats areas just outside the area. **Solitude** is moderate because of the low use in the area, but is sometimes affected by noise from nearby motorized recreation use in the Farmington Flats area. **Challenging experiences** are moderate. **Special Features or Attractions:** From the ridgeline, you can see vistas of the Great Salt Lake and Morgan Valley areas. The area has good habitat for deer. There are a few elk and moose that use the area as well as small game, grouse and raptors. There is a rare plant, the broadleaf beardtongue, present. There are no known heritage resource sites, but the area has moderate potential for historic and American Indian sites. **Manageability** is affected because of very narrow portions of the area such as on the Hogsback, which is surrounded by private land. The area between Farmington Flats and Bountiful Peak has

been excluded resulting in a difficult to manage boundary. The roadless area almost surrounds Farmington Flats FS road 084.

Need: The area is located near communities of Bountiful, Farmington and Morgan. The nearest wilderness is Mount Olympus about 15 miles to the south. It offers limited value as wilderness when compared to other nearby areas.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Hogsback **Management Area:** North Wasatch-Ogden							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	6,900	6,900	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.[1]

Name: Mueller Park #0419038

Acres: Gross: 7,700

This is a new roadless area in the FEIS that did not appear in the DEIS. It was identified by the public during the review of the DEIS and confirmed by the Forest Service for the forest plan revision.

Location and Access: It is situated on the western slopes of the Wasatch Range, east of the communities of North Salt Lake and Bountiful, along the Salt Lake and Davis County line. Much of the access is from the Mueller Park recreation area near Bountiful. Some access also occurs from North Canyon, the Great Western Trail and north of the State Capitol area.

Setting: The topography in the area is steep and rugged. The Sessions Mountains area is very rugged and remote. Elevations range from 5,600 feet along the Wasatch Front to around 9,000 feet below Grandview Peak. There are stands of deciduous trees along the lower stream canyons that provide brilliantly colored examples of exceptionally large maples and deciduous trees. There are also some secluded examples of old growth Douglas fir trees that have never been cut.

These Douglas fir and Gambel Oak communities are relatively undisturbed. The City Creek recreation managed by Salt Lake City lies to the south of the area and is popular for hiking, biking and picnicking. A Forest Service trailhead and picnic area exists at Mueller Park.

Availability: Much of the area is currently being managed as roadless. Steep terrain has limited chances for additional development. Development of the private lands along the Wasatch Front are limiting access on the western side. **Vegetation:** There are no known populations of rare plants in the area. Timber stands are small and no timber harvest will occur in this area. **Recreation:** The area near Mueller Park recreation area receives high use. In 2001, the Grandview Peak Trail was part of the Adventure Challenge Race special use event. A portion of the Great Western trail crosses the area in the Sessions Mountains and the annual Wasatch 100 race special use event uses this route. Use in the area includes day hiking, mountain biking, horseback riding, hunting, cross-country skiing and snowshoeing. Motorcycles are allowed on the Mueller Park and North Canyon trails. The Session Mountains portion has had substantial illegal ATV abuse. This has also occurred in the North Canyon area. A portion of the Heleski permit lies within the Session Mountains. **Minerals:** Approximately 46% of the area has private mineral rights. There are no existing oil and gas leases in the area. There is an inactive mine (Burro Mine) on the private land parcel included in the roadless area. **Wildlife:** The area is important winter range for deer, elk and moose. The area contains habitat for Peregrine Falcon and Goshawks. **Range:** There may be some old contoured terracing and seeding areas in the upper reaches from the 1930's to mitigate past overgrazing. Area contains parts of the Mill Canyon and Shingle Mill sheep allotments in the upper reaches of the area that are currently open, but in non-use. **Water:** The area is watershed for Bountiful City. There are some minor water developments in the canyons in the area. **Roads and Trails and Utility Lines:** The Kern River gas pipeline represents part of the northern boundary. The area contains about one mile of the non-constructed Rudy's Flat 4x4 road 80285. Other system roads have been excluded from the roadless area by a cherry-stem boundary. System trails include Mueller Park (Mill Creek), North Canyon and Grandview Peak and Great Western. **Insect and Disease:** No major insect and disease problem has been identified. **Fire:** Fire danger is high along the Front, because of fuels located not far from development and high visitor use in the lower reaches. **Land Ownership:** There is a 79 acre parcel of private land included within the roadless area. **Heritage Resources:** The area has had only limited surveys completed in the past, and there are no known heritage sites recorded. There is a moderate probability that cultural resources are present, particularly those related to early settlement of the valley and Native American sites.

Capability: The **naturalness of the area** and its integrity and appearance of the area are good. Remote areas in the upper portion of the area like Willey, Howard and Frederick Hollows offer secluded opportunities for **solitude**. Elephant Rock from the Mueller Park Trail provides breathtaking views of the Wasatch Front. Overall wilderness characteristics are average, opportunities for **primitive recreation** moderate while **challenging experiences** range from average in the lower reaches to high in upper pockets of the area. The Wasatch Front urban development is visible and audible from much of the area. **Manageability** of a boundary for wilderness is fair.

Need: The Mueller Park roadless area is located adjacent to the communities of North Salt Lake and Bountiful whose residents utilize the area for day Forest recreation. The nearest existing wilderness area is about 10 miles to the south (Mount Olympus). Much of the roadless area is similar to other roadless areas in Davis County. Public interest in this area as a roadless or wilderness area has been low, as witnessed by its late identification in the roadless process.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mueller Park **Management Area:** North Wasatch-Ogden Valley							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	5,300	3,800	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Motorized Travel Plan Roads Open (miles)	1.0	1.0	1.0	1.0	1.0	1.0	1.0

1. Prescriptions 1.5 + 2.4 + 2.6.

Central Wasatch Management Area

Name: Red Butte #0419037

Acres: Gross: 6,200

This is a new roadless area in the FEIS that did not appear in the DEIS. It was identified by the public during the review of the DEIS and confirmed by the Forest Service for the forest plan revision.

Location and Access: It is situated on the Western slope of the Wasatch Range northeast of Salt Lake City in Salt Lake County. It is located NW of Emigration Canyon, SE of City Creek and west of the Pinecrest area.

Setting: The topography is steep, rugged and brushy with elevations ranging from 5020 feet near Red Butte Reservoir to over 8,200 feet near the crest. The area has four distinct plant communities – riparian, grass-forb, oak-maple and coniferous. The area contains a lower elevation type that is not typical of nearby existing higher elevation wilderness areas. There are excellent examples of undisturbed gambel oak communities with maple and grass mixtures, one reason for its RNA status. There are a few scattered patches of aspen and fir pockets in the upper elevations. The University of Utah and Red Butte Gardens are located just west of the roadless area. The National Historic route for the Pony Express and Mormon Pioneers lies to the South in Emigration Canyon.

Availability: Vegetation: Red Butte is known for its high amount of botanical diversity. The area has a high number of known rare plant species including Hopkins Tower Mustard, Wasatch Rockcress, Small Yellow Lady's Slipper, Utah Fleabane, Broadleaf Penstemon and Beckwiths Violet. Timber harvest is not allowed and has not occurred since the 1800's. **Recreation:** Access for recreation to the RNA portion is not allowed. There is some hiking and mountain biking on the Skyline Trail as well as non-system trails such as Mount Wire and Georges Hollow. In the past, Red Butte reservoir was once used as a fishing location open to disabled veterans. Limited hunting in the RNA has been allowed in the past if the Utah DWR determined that conditions warranted it. The RNA was open to the general public for recreation on some days in 1987 and 1988, but it resulted in thousands of visitors and led to trampling of much vegetation along the main road. **Minerals:** There are no existing oil and gas leases in the area, and the area has no private minerals. The area is reported to have a unique combination of sedimentary strata that includes the Wasatch and Morrison formations accompanied by the Mississippian Humbug formation and possibly the Permian Arcturus formations. Red sandstone was quarried from the area starting in 1848 and up until 1940, especially in the Quarry Canyon area. Fossils have been found in the area such as in nearby Cephlapod Gulch. **Wildlife:** The area is very important for deer, elk and moose winter range. Bobcat and Mountain Lion have occasionally been observed. The area contains Colorado Cutthroat Trout. Red Butte Reservoir is used as a breeding location for the endangered fish, the June Sucker. Beaver were once native to the area and were

reintroduced in 1928, however they were removed in 1982 by the army because of possible giardia contamination in the water supply. With the loss of beaver dams, floods destroyed much of the riparian and marsh habitat in 1983, resulting in declines in associated biotic species. The Forest Service had proposed in 1991 to reintroduce them, but this was not allowed, because of concerns that beavers could create problems if they migrated to Red Butte Gardens or Emigration Canyon areas. A total of 51 species of mammals should hypothetically occur in Red Butte, of which 39 are known to occur. There have been 106 species of birds identified including 32 permanent residents, 44 summer residents and 30 migrants. **Range:** As a protected watershed for much of its history, for the most part the area has been kept free of grazing. **Water:** The area has not been used as culinary water since 1991. Prior to that it was used as a water source for Fort Douglas. RNA designation was given as the canyon was identified as one of the few remaining undisturbed watersheds in the Great Basin. Prior to that, the U.S. Army protected the area for its watershed and water quality. **Roads and Trails:** The upper part of Red Butte road 80253b was originally constructed but, approximately 4.5 miles up from the RNA entrance the road has now been closed for many years (there are signs and berms). It has reverted back to trail like conditions. This section is not being re-constructed or maintained neither for motorized use nor as a system trail. Parleys Fork 4x4 road 80224, except for the lower ¼ mile has also reverted back to trail like conditions. Mount Wire is a communication special use site, which could require motorized access for maintenance. There are several other old trails and road remnants that have reverted to trails within the area. **Insect and Disease:** No serious insect and disease problems.

Capability: The RNA designation denotes an area that has been set aside, because it contains unusual or unique features of substantial value to society and will be managed as a living museum and biological library. Consequently, the **naturalness of the area** is very high. Since access to the area is controlled/limited, the area has high **solitude** values, despite being adjacent to a high-populated urban area. Much of the area is quite rugged and trail-less with very brushy oak stands making route navigation a **challenging experience**. The area has high values for ecological research. The University of Utah Biology Department has conducted studies in the past in the area. Research has included physiological adaptation, nutrient cycling impacts from airborne (air pollution, acid rain), vegetation distribution and beaver population effects. Current opportunities for **primitive recreation** are almost always are not allowed, because of the RNA status. **Manageability** of the boundary for possible wilderness designation would be excellent, because of the current RNA boundaries.

Need: Red Butte is located adjacent to the Salt Lake metropolitan area. The nearest existing wilderness area is about 5 miles to the south (Mount Olympus). Public interest in the area as roadless or wilderness has been low as witnessed by its late identification in the roadless process, but this may be because of the fact that it was already protected as a RNA. Continued RNA protection has high public interest.

Alternatives and Potential Environmental Effects to Wilderness Character Roadless Area: Red Butte Management Area: Central Wasatch							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	0	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	4,600	3,200	3,200	6,000	5,200	5,300	4,800
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)[2]	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)[2]	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6 + 3.1 and 3.1a. For this roadless area, 3.1 and 3.1a acres within the proposed RNA are also considered as protecting Wilderness Character.[1]
2. Red Butte is currently managed as a Research Natural Area. Public recreation is not allowed and any existing roads and trails are not open for motorized or non-motorized use.

Name: Mount Aire #0419008

Acres: Gross: 9,700

Location and Access: The Mount Aire Roadless Area is located in the Wasatch Range east of Salt Lake City, bordered by Parleys and Lambs Canyon on the north and Mill Creek Canyon on the south. Access to the area is via the county road in Mill Creek Canyon, the Lambs Canyon Road, and Interstate 80 in Parleys Canyon.

Setting: The area is composed of primarily brush-covered steep slopes ranging to about 8,600 feet in elevation. Mount Aire and Grandeur Peak are the most prominent features. Vegetation at lower elevations includes maple, gambel oak and box elder with some aspen and fir are present at higher elevations.

Availability: Vegetation Treatment: There are an estimated 500 acres of tentatively suited timber within the area. **Recreation:** The area is a very popular dispersed recreation area. Almost all the hiking is day use. There are some limited cross-country skiing and snowshoeing opportunities. The Pipeline Trail, paralleling a ¼ mile above the canyon is one of most popular mountain bike trail opportunities near Salt Lake. Use is extremely heavy on the Pipeline, Rattlesnake Gulch, Mount Aire and Grandeur Peak Trails. Burch Hollow and Lambs Canyon Trails receive lower use. Part of the area's popularity can be attributed to the fact it is one of the few areas in the Salt Lake portion of the Wasatch Front where dogs are allowed. Use is very low off the system trails due to brush and steep rocky slopes. The area does have some limited

hunting. **Minerals:** Minerals are federally owned. There are no known significant mineral deposits. **Range:** There are no grazing allotments in the area. **Water:** Part of the area is in Salt Lake City municipal watershed, but currently it is not for culinary water purposes. North side drainages contribute to the Mountain Dell Reservoir, while south side drainages contribute to Mill Creek. **Land Uses:** The eastern side is currently under permit for guided helicopter skiing opportunities. There is a utility corridor from the 1985 Plan, which crosses the northwest corner of the area. **Roads and Trails:** The area contains no roads. All trails are non-motorized.

Capability: The **naturalness of the area** has been somewhat affected in heavy trail use areas but the natural integrity is intact otherwise. Air pollution, noise pollution and visual views of urban development affect this area. The narrowness and proximity to development can affect the **solitude** available to the visitor. Noise from traffic, Mill Creek visitors and Lambs Canyon summer home users is often heard. Solitude opportunities are very low along the trail corridors year round; however off trail visitor can experience outstanding opportunities for solitude. The area can present very **challenging experiences** off trail. An example is the northern ridgeline of Mill Creek Canyon, which is very brushy and rocky and requires route-finding skills. **Special Features or Attractions:** The area has a rare plant, the Wasatch Daisy. The area has habitat for peregrine falcon and golden eagle. The area is important summer and winter range for deer, elk, moose, and small game. There is moderate potential for discovery of historical mining and American Indian sites. **Manageability** is somewhat affected by the narrowness of the area (down to ½ mile in places), having a large portion of the area surrounded by private land and being adjacent to the heavily-used Mill Creek Canyon.

Need: The area is adjacent to Salt Lake City. There are three other wilderness areas within close proximity of Mount Aire. Although somewhat similar to nearby wilderness areas, Mount Aire does offer some diversity in wildlife and lower elevation habitat. This area may have similar watershed protection needs in the future as the other nearby wilderness areas. Salt Lake City Public Utilities is currently not pushing for wilderness designation for this area; however the area has strong local support from the public and environmental groups on having the area designated as wilderness or at least roadless undeveloped management.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Mount Aire **Management Area:** Central Wasatch							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	9,400	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	9,400	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0

Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Mount Olympus #0419007

Acres: Gross: 10,000

Location and Access: The area is located on western slope of Wasatch Range between Big Cottonwood and Mill Creek Canyons. The area is composed of three separate parcels. Most of the area is east of the existing Mt Olympus wilderness. The two remaining parcels are Neffs Canyon and areas along the Mill Creek and Big Cottonwood corridors. Access to the area is provided by State Highway 152 (Big Cottonwood) and county road in Mill Creek Canyon.

Setting: Elevations range from about 6,000 feet to 10,246 feet on Gobblers Knob. Much of the area has steep rugged slopes with alpine scenery in the higher elevations. Douglas fir and subalpine fir grow in scattered patches on northern exposures and higher elevations. Other vegetation includes Gambel oak, maple, mountain mahogany, aspen and box elder.

Availability: Vegetation treatment: There are an estimated 2,500 acres of tentatively suited timber within the area. **Recreation:** The area is a very popular year round recreation area. Uses include hiking, backpacking, cross-country skiing, snowshoeing and some limited hunting. There is no motorized recreation, except for helicopter skiing in the winter. Most trails receive extremely heavy recreation use. Lake Desolation and a climb to the top of Gobblers Knob are popular hikes. The area has some of the best high elevation mountain biking opportunities in the Salt Lake area. Trails such as Dog Lake, Big Water, Mill D North, Desolation, and Great Western receive a high amount of mountain biking use. **Minerals:** The majority of minerals are federally owned except for 450 acres. The area has evidence of past mining activity, but there is little evidence of current mining activity. It is a mineralized area and has the potential for mineral reserves. **Range:** There is no permitted domestic livestock grazing. **Water:** The area is part of the municipal watershed for Salt Lake City. Neffs Canyon has potential for water development. **Land Uses:** Mount Olympus Water has a long-term special use permit for access rights to their water system. Parts of the area such as Alexander Basin/Gobblers Knob are under permit for guided helicopter skiing opportunities. These areas were excluded in the 1984 Wilderness Act because of this use. **Roads and Trails:** The area contains several non-motorized trails including the Great Western Trail on the eastern edge. The trail to Alexander Basin is one of the steepest in the Wasatch Range gaining 2000 feet in 1.5 miles.

Capability: The **naturalness of the environment** has been influenced little by human intrusion. The naturalness and associated values are high in the Alexander Basin/Gobblers Knob area and moderate in other portions of the area. **Solitude** is mostly moderate throughout the area but

diminishes in areas near the Mill Creek and Big Cottonwood Canyon corridors. More solitude is offered in the interior and eastern portions especially in off-trail areas and in Alexander Basin. Development along the Wasatch Front is highly visible from the western portion of the area. Opportunities for **primitive recreation** are excellent. **Special Features or Attractions:** Scenery and views are outstanding in much of the area. The country around Alexander's Basin/Gobblers Knob is very steep and rugged, a geologic wonder of glaciation. Neffs Canyon has a deep limestone cave, managed for protection of cave resources. The area has habitat for Peregrine Falcon and golden eagle. There is summer and winter range for deer, elk, moose, bear and transplanted mountain goats. Forest Service sensitive plant *Wasatch jamesia*, and rare plants Wasatch shooting-star, and Wasatch and broadleaf beardtongue are present. The area has one known heritage site and has moderate potential for discovery of mining and American Indian sites. The **manageability** of the area as wilderness could be difficult along Mill Creek and Big Cottonwood because of heavy recreation developments and the Porter Fork summer homes area. The proximity of the Porter Fork development could create potential conflicting uses as evidenced by the occasional snowmobile trespass from this area into the existing wilderness. There is one private inholding near Beartrap Fork.

Need: The area is adjacent to the Salt Lake metropolitan area. It is contiguous to the existing Mount Olympus Wilderness area. Across Big Cottonwood Highway is the Twin Peaks Wilderness area. The area has a lot of public interest in wilderness especially in the Alexander Basin/Gobblers Knob area. Many have emphasized watershed protection, ecosystem and wildlife values and primitive recreation needs in the vicinity of urban populations. Some would prefer heliskiing and mountain biking opportunities continue. Local environmental groups and Salt Lake City Public Utilities recommend much of this area as wilderness.

Alternatives and Potential Environmental Effects to Wilderness Character
Roadless Area: Mount Olympus
Management Area: Central Wasatch

Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	9,300	2,200	2,000	0	0	0	0
Wilderness Character Protected (acres)[1]	9,300	2,200	2,000	0	0	2,000	2,000
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0.2	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0.2	0.2	0.2	0.2	0.2	0.2
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Twin Peaks #0419006

Acres: Gross: 6,500

Location and Access: The Twin Peaks Roadless Area is located in the Wasatch Range between Big Cottonwood and Little Cottonwood Canyons, west of Brighton and east of Salt Lake City and is composed of eight units. Four are less than 100 acres and three are smaller than 300 acres. Most of the area is within one unit of 5,600 acres and includes Mineral Fork, Days Fork and Silver Fork Canyons. Included in the Twin Peaks Roadless Area are Reed and Benson Ridge, Greens Basin, Mats Basin, and the area west of Kessler Peak. Along the Wasatch Front, the smaller parcels include Deaf Smith Canyon, the mouth of Ferguson Canyon and an area above the Little Cottonwood Park and Ride Lot. Access to the area is via State Highways 152 and 210 or from Wasatch Boulevard.

Setting: Much of the topography is rugged and steep, with peaks towering up to 11,000 feet (east of Superior Peak). The vegetation varies from maple, box elder, and Gambel oak to heavy stands of subalpine fir, aspen and some Douglas fir. There is also steep rock slope, riparian habitat, as well as subalpine and alpine country in the upper reaches.

Availability: Vegetation treatment: There are an estimated 800 acres of tentatively suited timber within the area. **Recreation:** Day hiking, cross-country and backcountry skiing, snowshoeing, and snowboarding are popular, especially in Mineral Fork, Days Fork and Silver Fork. The Mineral Fork trail is open to ATVs (vehicles less than 50 inches wide), motorcycles and mountain bikes. Motorized use is generally low except during hunting season. Use is low in Deaf Smith Canyon because access is difficult with housing developments adjacent to the forest boundary. Part of the Bonneville Shoreline Trail is proposed to cross near Ferguson and Deaf Smith Canyons. **Minerals:** The area has had mining activities in the past and some interest in prospecting continues. Some of the mining claims are still active and could warrant future access needs. The area does show evidence of mineralization. Most of the minerals are federally owned though in Deaf Smith Canyon and above Little Cottonwood Park and Ride there is substantial acreage of privately- owned mineral rights. There is one mining claim in lower Deaf Smith Canyon. There are no oil and gas leases and the potential is low. **Range:** There is no permitted domestic livestock grazing. **Water:** The area is part of the Salt Lake City municipal watershed. **Land Uses:** Parts of the area are under permit for guided helicopter skiing opportunities. These areas were excluded in the 1984 Wilderness Act because of this use. Solitude Ski area has expressed interest in expanding its downhill ski development into Silver Fork. **Roads and Trails:** It includes (or parts of) Mineral Fork, Days Fork, Silver Fork, Deaf Smith Canyon, and Ferguson Canyon Trails.

Capability: The area has moderate values for **naturalness** and environmental values with interior areas providing higher values. Much of the area is similar to the existing wilderness area. Opportunities for **solitude** and serenity are affected by the nearness to the Salt Lake Valley metropolitan area and the heavy recreation corridors of Big and Little Cottonwood Canyons. During the winter months solitude is also affected by helicopter noise at some times in some

areas. The steep and off-trail country however provides diverse and **challenging experiences** and **primitive recreation**. Deaf Smith Canyon with its limited access and rugged, remote terrain offers excellent solitude and challenge. **Special Features or Attractions:** The area has renowned examples of glaciations. Little Cottonwood Creek was found eligible to be included in the wild and scenic river inventory. The area contains habitat for peregrine falcon and golden eagles. Little North Deaf Smith Canyon does have the sensitive Bonneville cutthroat trout. The parcels of roadless along the Wasatch Front provide important winter big game habitat. Many plant species of concern are present. They include Garrett's bladderpod, *Wasatch Jamesia*, Garrett's daisy, Wasatch fitweed and broadleaf beardtongue. The area contains sites of historic mining activities. There is high potential for additional mining sites and some potential for American Indian sites. **Manageability** of the area as wilderness could be affected by the seven parcels of private land included, primarily in the narrow corridor area (only ½ mile wide in places) by Montreal Hill and west of Reed and Benson Ridge. The development potential of these lands is limited because of the area's steepness and county land use restrictions. Two of these parcels are owned by Salt Lake City for watershed values. Private mineral ownership of these parcels, as well as other tracts in the Deaf Smith Canyon and above the Little Cottonwood Canyon Park and Ride could create conflicting uses should they ever be developed.

Need: The closest portions of the area are adjacent to Wasatch Front communities. It is contiguous to the existing Twin Peaks Wilderness Area. People who support this area for wilderness see a strong need for the primitive recreation opportunities provided in close vicinity to urban populations. They also see the need to manage these areas to protect them from impacts. The area has strong public support from the City of Salt Lake (for watershed protection), as well as local environmental organizations for wilderness designation. Former Congressman Cook studied the area for possible wilderness designation.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Twin Peaks **Management Area:** Central Wasatch							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	5,700	2,300	500	0	0	0	0
Roadless/Wilderness Character Protected (acres)[1]	5,700	2,300	500	0	0	1,600	1,600
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	2.7	2.7	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0.1	0.1	2.8	2.8	2.8	2.8	2.8
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: White Pine #0419004

Acres: Gross: 1,900

Location and Access: The area is located in the Wasatch Range south of Little Cottonwood Canyon and west of Snowbird Ski Area. The northern boundary is the Little Cottonwood Highway, the eastern boundary is Snowbird Ski Area, the southern boundary is the Uinta National Forest and the western boundary is the Lone Peak Wilderness. Access to White Pine is from a trailhead on State Highway 210 (Little Cottonwood). There is one private inholding.

Setting: Topography is rugged and steep with peaks towering over 10,000 feet. White Pine Lake (constructed reservoir) is a picturesque mountain lake located near the southern portion of the roadless area. Douglas fir and subalpine fir grow in scattered patches on the northern exposures and higher elevation. There is also gambel oak, maple, mountain mahogany, aspen and box elder. The upper portions of White Pine are alpine and subalpine terrain.

Availability: Vegetation treatment: There are an estimated 300 acres of tentatively suited timber within the area. **Recreation:** The area receives heavy hiking and backpacking use primarily on the White Pine and Red Pine trails. Mountain biking use is moderate, with most riders only going as far as the Red Pine/White Pine trail junction. Extreme bikers can continue all the way to the lake. There is some fishing at White Pine Lake. The area is very popular in the winter for outstanding backcountry skiing opportunities. **Minerals:** Minerals in the area are federally owned. **Range:** There are no permitted livestock. **Water:** The area is part of Salt Lake City's municipal watershed. **Land Uses:** The White Pine dam and road are under a special use permit that allows occasional motorized access for maintenance. Snowbird Ski Resort has expressed an interest for potential expansion in the White Pine area. The area is currently under permit for guided helicopter skiing opportunities. **Road and Trails:** A developed trail, which was a former road, leads to White Pine Lake. **Fire:** Area has low fire potential. There could be a need for fire control access, given its proximity to resort structures. **Insect and Disease:** Insect populations are low.

Capability: The **naturalness of the environment** is moderate to high and influenced very little by human development except for the trail (former road) and the lake (reservoir with dam). Geological, biological, ecological, educational and historic values are moderate. Opportunities for **solitude** and **challenge experiences** are excellent away from the White Pine trail. There are some very rugged rock climbs and backcountry ski runs. **Special features and attractions:** The area is very scenic. The area provides habitat for deer, elk, moose, bear, mountain lion, and golden eagles. A Forest Service sensitive plant, Garrett's bladderpod is present. Other rare plants such as Garrett's daisy, Wasatch fitweed, and broadleaf beardtongue also inhabit the area. There are no known heritage sites but the area has moderate potential for discovery of American Indian and mining sites. The **manageability** of the area as wilderness is fairly good because it is mostly surrounded by easily identified ridgelines. The western boundary is adjacent to Lone Peak Wilderness. The ability to manage the area as wilderness along the eastern boundary would be more difficult given its proximity to Snowbird Ski Area.

Need: It is adjacent to Lone Peak Wilderness. Both the Mount Olympus and Twin Peaks Wilderness are nearby. The area is within a 5 to 10 mile drive from Salt Lake City. It is one of the most accessible high alpine areas in the Wasatch. There is strong public and Salt Lake City support for wilderness designation of the area. Others have said this area is needed for mountain bike use, heliski opportunities (key important area) and the potential ATV use.

Alternatives and Potential Environmental Effects to Wilderness Characteristics **Roadless Area:** White Pine **Management Area:** Central Wasatch							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	1,900	1,900	0	0	0	0	0
Wilderness Character Protected (acres)[1]	1,900	1,900	0	0	0	1,900	1,900
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6

Name: Lone Peak Additions #0419027

Acres: Gross: 900

Location and Access: There are 3 parcels along the Wasatch Front-- Little Willow Canyon, Rocky Mouth Canyon and an area near Corner Canyon with a fourth parcel just south of Little Cottonwood Canyon near Coalpit Gulch. State Highway 210 can access that portion.

Setting: The area is lower elevation (5,500 to 8,000 feet) and primarily consists of rock, grassland, and scattered oak/maple patches with a few conifer.

Availability: Vegetation treatment: There are less than 100 acres of tentatively suited timber within the area. **Recreation:** The areas receive frequent use from local neighborhoods. Sandy City has established trailheads at Rocky Mouth and Little Willow Canyons. Use is primarily day hiking on user-created trails. Little Cottonwood Canyon is popular for dispersed use along the Creek. A mountain bike route leads up the canyon from the Temple Quarry Nature Trail. The Uinta National Forest has a trailhead just outside the boundary of the south end of the Corner Canyon parcel. It eventually leads to Lone Peak Wilderness. **Minerals:** Minerals on about 320 acres are privately owned. Most of the private minerals are in the Coalpit Gulch area. Mineral potential is suspected to be low. **Range:** There is no grazing by domestic livestock. **Water:** The

area has some water rights. **Land uses:** There are developments present used by irrigation companies. **Roads and Trails:** The Bonneville Shoreline Trail could potentially cross three of the parcels.

Capability: The parcels on the front have **naturalness of the environment** diminished because of adjacent urban development. However, the parcel on the south side of Little Cottonwood is moderate in naturalness. The natural appearance in Corner Canyon has been diminished because of the resource damage caused by user-created ATV routes. **Solitude** and remoteness are quite limited being next to the Wasatch Front. **Primitive recreation** opportunities and challenging experiences are limited. **Special Features or Attractions:** Little Cottonwood Creek was found eligible in the Wild and Scenic River Inventory. The area includes some important deer winter range. A Forest Service sensitive plant *Wasatch jamesia* is present. The area has no known heritage sites but moderate potential for discovery of relic mining and American Indian sites. The **manageability** of the area as wilderness is hampered because it is adjacent to private land that may be developed in the future. Privately-owned minerals could create conflicting uses should they ever be developed.

Need: The area is contiguous to the existing Lone Peak Wilderness area. Public interest in these parcels as future wilderness has been low.Alternatives and Potential Environmental Effects to Wilderness Character.

Alternatives and Potential Environmental Effects to Wilderness Characteristics **Roadless Area:** Lone Peak **Management Area:** Central Wasatch							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	900	500	0	0	0	0	0
Wilderness Character Protected (acres)[1]	900	500	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Stansbury Management Area

Name: Stansbury Mountains #0419011

Acres: Gross: 39,700

Location and Access: The Stansbury Inventoried Roadless Area is located in an isolated mountain range in the Great Basin. It is located southwest of Grantsville, Utah. The roadless area surrounds the Deseret Peak Wilderness area. Primary access to the area is Forest Service rod 578 in South Willow Road from Grantsville. There is also access by other low development roads from the Skull valley Road, Highway 199 from Terra and Granstsville to St. John.

Setting: The terrain of the northern part of the range is steep and rugged while the southern part is rolling brush-covered area with some rocky peaks and slopes. Elevations range from 6,000 feet in the foothills to 10,301 feet at Vickory Mountain. The area contains some unique springs, limestone caverns and isolated forested stands.

Availability: Vegetation treatment: There are an estimated 1,200 acres of tentatively suited timber within the area. Fuelwood gathering has been allowed in the past, but is not currently being managed for that activity. **Recreation:** Use includes hiking, backpacking, horseback riding, motorized recreation, mountain biking, rock climbing, dispersed camping and hunting. The area receives some local snowmobiling use. **Minerals:** Minerals are federally owned. There are a few small claims that have been active in the past. The area is rated as low for oil and gas potential. **Range:** Cattle graze under permit throughout most of the area. **Water:** Water is used for agriculture and local community needs. **Land Uses:** There are minor water developments in some side canyons. **Roads and Trails:** There are numerous low maintenance and user-created roads. There are several motorized and non-motorized low maintenance trails. The Stansbury Front Motorized Trail, which traverses the east side of the range is very popular. West Canyon also receives OHV use, but it is much more limited.

Capability: The **naturalness of the environment** is intact with few human intrusions noticeable. Evidence of user-created trails and roads and historic small watershed treatment terracing areas detract from the area's natural integrity in isolated areas. There are moderate values for naturalness, geological, biological, ecological and wildlife habitat. **Solitude** is outstanding because of the isolation, size and topography of the area. The area is wild and remote offering **challenging experiences** to visitors. **Special Features or Attractions:** The area is unique from much of the Wasatch-Cache, because it is part of the Great Basin ecosystem. The range itself is very scenic with views of the existing wilderness, surrounding desert and the Great Salt Lake. Area has one rare plant, the broadleaf beardtongue. There is habitat for deer, elk, mountain lion, raptors including peregrine falcon and goshawk, and a variety of small animals. There is potential for reintroduction of bighorn sheep. The area around Big Creek on the western side is part of the Big Creek Wild Horse Territory. Brown trout are found in North Willow Creek and rainbow trout are found in South Willow Creek. The **a**rea has about 20 known heritage sites

including a prehistoric chipping area. Much of the area has high potential for discovery of relic mining and American Indian sites. **Manageability**: The Stansbury Front Trail dissects a major portion of the northern end of the roadless area. The proximity of motorized trails and accessible roads near future wilderness boundaries would create potential trespass problems as evidenced by current problems in Deseret Peak Wilderness. The Mining Fork Road and private land access would be difficult to manage because of the area between it and South Willow Canyon is very narrow.

Need: It is located 20 miles from the rapidly growing Tooele area and about 50 miles west of Salt Lake. It surrounds the existing wilderness area and is contiguous to BLM Wilderness study areas in the north and south. There have been several public comments to include the roadless area, existing wilderness and BLM WSA and other contiguous lands as a large wilderness ecosystem area. The area is known as a desert island roadless area, part of the Great Basin and Range ecosystem. There is some opposition to wilderness additions from local communities.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Stansbury Mountains **Management Area:** Stansbury							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	***7***
Recommended Wilderness (acres)	37,300	17,100	5,000	0	0	0	0
Wilderness Character Protected (acres)[1]	37,300	33,900	17,100	0	0	17,100	17,100
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	24.9	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0.2	26.2	26.2	26.8	26.8	26.8	26.8
Motorized Travel Plan Roads Open (miles)	0	0.4	0.4	0.4	0.4	0.4	0.4

1. Prescriptions 1.5 + 2.4 + 2.6.

Western Uintas Management Area

(The High Uintas Roadless Area is described in the Eastern Uintas Management Area)

Name: Nobletts #0419003

Acres: Gross: 3,100

Location and Access: Most of Nobletts roadless area is on the Heber District of the Uinta National Forest. This following will describe the Wasatch – Cache portion. It is located south of the Mirror Lake Highway between Pine Valley and Soapstone about 10 miles east of Kamas. The northern boundary is the Mirror Lake Highway, the western boundary is private land in Pine Valley and the southern boundary is the Uinta National Forest. Access from the Wasatch – Cache side is limited due to the Provo River, steep slopes and private land. Most access to the area comes from the Uinta National Forest side.

Setting: Much of the area is a heavily timbered mountain up to 9,400 feet forested with aspen, lodgepole pine, Englemann spruce, subalpine fir and Douglas fir. There are rocky cliffs above the Provo River on the north side of the area.

Availability: Vegetation treatment: There are an estimated 1,700 acres of tentatively suited timber within the area. **Recreation:** Because of the area's limited access, use is low. There is some hiking, horseback riding, cross-country skiing, and hunting. Dispersed recreation and fishing are popular on the north side of the Provo River. The portion north of the Provo River along the Mirror Lake Highway receives heavy dispersed recreation use. Terrain limits most snowmobiling opportunities. The area contains part of a groomed ski and snowmobile route near the Provo River. **Minerals:** Minerals are primarily federally owned except for about 100 acres. Mineral potential is low. **Range:** Cattle graze in a portion of in the area. **Water:** Water use is for livestock use. **Roads and Trails:** There are a couple of system trails by the Provo River. There are no roads designated as open in the area. A few user-created roads are present.

Capability: The **naturalness of the environment** is high in its quality and integrity, because of its limited access and topography and little influence from human activities. The area provides moderate geological, biological, ecological and educational values. While the area does receive low use, **solitude** is somewhat diminished by the influence from Mirror Lake Highway and the Soapstone Summer Home area. **Primitive recreation** opportunities and **challenging experiences** are limited. **Special Features or Attractions:** The area provides habitat for bear, mountain lion and moose. It is an important area for elk calving. Views of the scenic rocky cliffs above the Provo River are especially pleasing. There are no known heritage sites and moderate potential for historic logging and American Indian sites. **Manageability** of the area is limited because its small size. Management of the area as wilderness is affected by adjacent private land on the west end.

Need: The High Uintas Wilderness is about 8 miles away to the east. The area is about 15 miles from Kamas and 65 miles from Salt Lake City. Some people felt designating wilderness here would protect a larger intact ecosystem important for wildlife needs.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Nobletts **Management Area:** Stansbury							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	2,700	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	0	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Lakes #0419005

Acres: Gross: 122,000

Location and Access: The Lakes Roadless area is immediately east of Kamas and north of Mirror Lake Highway. The area includes the headwaters of the Bear, Weber, Provo and Duchesne Rivers. Most of the area is within Summit County. Access to the area is State Highway 150 (Mirror Lake Highway), county road 213 (Weber River) and Forest Service road 160 (Whitney Reservoir)

Setting: Elevations range from about 7,500 feet on the west and south ends to 11,943 feet atop Bald Mountain near the east end. Mount Watson at 11,521 feet is another well-known peak. Deep canyons, forests and meadows characterize the west end; the east end is alpine country with high peaks and numerous natural and nine reservoirs. The extreme western and southern sections are vegetated with mountain mahogany, juniper, and sagebrush. The central portion is forested with aspen, lodgepole pine and mixed conifer stands. The high country is characterized by isolated stands of mixed conifer, patches of krumholz on windswept ridges and meadows composed of grasses and sedges.

Availability: Vegetation treatment: There are an estimated 45,000 acres of tentatively suited timber within the area. Evidence of previous timber sales is nearby. There is potential for

prescribed burning in some of the area for habitat diversity improvements. **Recreation:** The area is extremely popular and receives high visitation. The more popular uses include day hiking, backpacking, horseback riding, fishing, hunting, wildlife watching, snowshoeing, cross-country skiing, dispersed camping, and snowmobiling. The many lakes and higher elevation areas are major attractions during the summer months and several receive very high use. There is some mountain bike use. Motorized trails receive heavy use during the deer-hunting season and use is increasing. Snowmobiling is very popular with most of the higher use in the outer portion of the area (approximately 42% of the area). The remaining area provides opportunities for the highly skilled and adventuresome snowmobiler. About 95% of the roadless area is currently open to snowmobiling in the District travel plan. There is some rock climbing with fixed anchors in the Stone Garden area by Ruth Lake, near mile marker 18, on Bald Mountain and on the ridge north of Boy Scout Camp Steiner. **Minerals:** The majority of minerals are federally owned with an estimated 600 to 700 acres privately owned. The area has limited hard rock mining potential. There has been some prospecting in the past in Dry Fork near Fish Lake, in the South Fork of the Weber, Paulsin Basin and near Hoyt Peak. Two claims in the Paulsin Basin area are active and have proposed exploration and small-scale development. The area has low potential for oil and gas. There is one lease (about 100 acres) in the area around Gold Hill on the Evanston District. **Range:** Cattle are permitted to graze in much of the area except Dry Fork, Main Weber, Ruth Lake area and south of Bald Mountain. Cattle are not authorized above the 9800 feet elevation level. Sheep graze in lower Smith & Morehouse and directly south of Whitney Reservoir. **Water:** As the headwaters for several important streams, the area is a valuable watershed providing irrigation and culinary water to farms and communities downstream. **Land Uses:** There is one outfitter permit for cross-country skiers that use yurts for overnight use. Guided youth programs are also permitted in the Yellow Pine, Coop, Shingle, Norway Flats and Boulder Creek drainages. There are two snow-monitoring sites operated by the Natural Resources Conservation Service in Paulsin Basin and Spring Canyon, which are sometimes maintained by helicopter support. There is a small electronic site near the West Portal and and a repeater station on Bald Mountain. There are nine reservoirs owned by private companies and operated under special use permits (Sand, Fish, Anchor, Ibantic, Castle, Kamas, Meadow, Abes and Notch. Maintenance to these reservoirs is generally limited though at times by helicopter support. **Roads and Trails:** The area has four short segments of roads that are designated open in the District travel plan. There are a few motorized trails primarily in the northwest corner of the area such as Swifts Canyon, White Pine, South Fork Weber River, Hoyt Peak and Slader Ridge. The area has substantial miles of non-motorized trails.

Capability: The **naturalness of the environment** is outstanding particularly in the core of the area where man-made developments have influenced the wildness of the area very little. Resource damage from ATVs detracts from the natural appearance in several areas. The area is known for its large open country carved by glaciers, scenic vistas and high country lakes and wetlands. The Middle Fork of the Weber River has some of the wildest country in the Uinta Mountain Range. Areas like south of Abe’s Lake and Hells Kitchen are known as very remote areas. Historic uses such as logging, shingle mills, mining and water developments have penetrated into the area though little evidence remains except for the dams, reservoirs and a few

scattered remains. Many former reservoirs have been stabilized to natural lake levels. Restoration in these areas complements the undeveloped character of the land. Past watershed treatment terracing areas in the Mud Lake Flat area (about 370 acres) are no longer substantially noticeable. Timber sales around the perimeter have affected the natural appearance somewhat in these areas. The opportunity for solitude ranges from moderate to high depending on location, distance from development, vegetation and topography. Because of its large size, there are good opportunities for **solitude** and remoteness. Noises from Mirror Lake Highway can be heard in portions of the roadless area with snowmobile noise being the most dominant. Solitude in the non-winter months is higher off trail, along the Weber River side, and on the Evanston District side by Whitney Reservoir. During summer season the solitude is diminished at some lakes because of crowding. Opportunities for **challenging experiences** are rated as moderate with much of the use from short day hikes. Diverse opportunities exist for **primitive recreation**.
Special Features or Attractions: The Lakes area includes some of the most scenic country and trails in northern Utah and in the state. The area has several segments of streams found eligible in the wild and scenic river inventory – Main Fork Weber, Middle Fork Weber, Beaver Creek, and the Provo River. The area has abundant variety of species because of the diverse habitat present. The area is important summer and winter range for deer, elk and moose. There are also mountain lions, black bear, pine marten, weasel, beaver, bobcat, coyote, pika, badger and skunk. The Utah State Division of Wildlife Resources has introduced mountain goats in the area. The area is potential lynx habitat. Over 100 species of birds inhabit the area. Bonneville cutthroat trout are native to the area. Introduced fish include brook trout, rainbow trout and artic grayling. Sensitive species present include goshawk, boreal owl, and boreal toad. There is a Utah species of concern, the smooth green snake and the area has potential habitat for the spotted frog. The area has Forest Service sensitive plant, rockcress draba and a rare plant, *Utah ivesia*. The area contains some known heritage sites. Limited prehistoric cultural evidence has been found in some isolated spots. There are a few remains of old cabins associated with shingle mills and discarded machinery associated with attempted mining operations. There is high potential for further discovery of past logging, water development, and American Indian sites. The **manageability** of the area as wilderness is complex because the boundary meanders substantially. The area is large over 122,000 acres, which allows some flexibility to help designate a more manageable area. There are several roads excluded such as Paulsin Basin, Upper setting, Norway Flat, around Lambert Meadow, Gardners Fork, Slader Basin, Box Canyon, Mud Lake Flat, Swift Canyon etc. Proximity to private land and private inholdings contribute to the complexity. The north and west sides are primarily adjacent to private land. Present vehicular trespass in closed areas especially on the Weber River side suggests potential problems in the future. There are two private inholdings west of Holiday Park. In addition, there is one private inholding of 158 acres excluded out with a cherry stem in the northwest corner by Swifts Canyon. Private land peninsulas intrude into the roadless area by Hoyt Canyon and Holiday Park.

Need: The area is 60 miles east of Salt Lake City. Both Kamas and Oakley are only about 3 miles away from the western edge of the roadless area. The nearest wilderness area is the High Uintas, the largest wilderness area in Utah. It is separated from the Lakes area by the Mirror Lake Highway corridor, in some places only 1 mile away. Lakes area is very significant as a

roadless area, because of its size, one of the largest in Utah. Many view it is a large valuable ecosystem when combined with the roadless area and wilderness of the High Uintas. Because of this size it offers important habitat for the survival of wildlife. The effects on lynx and other carnivores and their habitat from winter recreation are an issue. The area has probably received the highest amount of public interest of all the roadless areas on the Forest. This interest has been highly polarized with some people very much in support of wilderness designation and others very much opposed to the idea. The support for wilderness designation includes environmental organizations that have emphasized this area as a high priority for wilderness designation. Some groups have proposed the area as the Mount Watson Wilderness – this is approximately the inner 2/3 of the roadless area (approximately 71,000 acres). Opposition is also high against the Lakes area as wilderness, primarily from the snowmobile community, summer motorized users and some local residents. Many feel it is better managed, as it is now as backcountry allowing for winter motorized use. The Lakes backcountry is a very valuable niche for the increasing demand for non-wilderness backcountry. It offers high lakes that contain fishing opportunities, for visitors wanting a backcountry-fishing trip, but not necessarily a wilderness experience that impacts the wilderness. This type of management could allow for more cost effective mitigation of human impacts in the face of drastically declining budgets. The demand for this type of opportunity is rapidly increasing. This area is viewed by the snowmobiling community as one of the critical opportunity areas for their use. Snowmobile use is viewed as important economic sources for communities like Kamas and Oakley.

Alternatives and Potential Environmental Effects to Wilderness Character **Roadless Area:** Lakes **Management Area:** Western Uintas							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	119,200	71,900	0	0	0	26,300	38,000
Wilderness Character Protected (acres)[1]	119,200	76,400	60,400	0	0	64,800	65,500
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	11.1	4.5	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	0	8.6	13.1	13.1	13.1	13.1	13.1
Motorized Travel Plan Roads Open (miles)	0	1.9	1.9	1.9	1.9	1.9	1.9

1. Prescriptions 1.5 + 2.4 + 2.6.

Eastern Uintas Management Area

Name: High Uintas #0419022

Acres: Gross: 103,100

Location and Access: The High Uintas Roadless Area is located on the Ashley and Wasatch-Cache National Forests. This write-up describes only the Wasatch-Cache portion. The area is a strip of land lying along the western and northern boundary of the High Uintas Wilderness in north central Utah. Most of the access is off of or from roads and trails accessing State Highway 150 (Mirror Lake Highway) or Forest Road 058 (North Slope Road. In addition, there is one small area of 100 acres between Burnt Fork Lakes and Reader Lakes in the roadless area.

Availability: Current resource demands and uses of the roadless area vary significantly across the roadless area. Because the area is so large, characteristics of smaller areas will be discussed as appropriate.

Vegetation Treatment: Timber harvest in the area began in the 1860's, when the wood was used for railroad ties and charcoal. Evidence of past and present timber harvest is present in areas directly outside of the area. Several old timber sale areas are being used for fuelwood gathering permits. There are 43,300 acres of timber considered tentatively suited for harvest. Areas with higher timber values are found near Boundary Creek, East Fork Blacks Fork, West Fork Smiths, Middle Fork Beaver and Beaver Creek. There has been a proposal for timber harvest units in the Thompson/Kabell areas, where there are large stands of dead lodgepole pine. **Recreation:** The High Uintas Roadless Area is extremely popular for backpacking, horse packing, hiking, hunting, fishing and dispersed camping. Mountain biking is gaining in popularity. Much of the roadless area is used as primary access into the wilderness. ATV use is popular in several areas including Murdock Basin, Broadhead Meadows, and Wolverine areas. Big game hunting is heavy in portions of the area with less use on the Kamas District side. Recreation use is heaviest in areas accessed by roads and trails and around popular lakes. Lake basins are popular and receive high visitation. Snowmobiling use as well as non-motorized winter recreation (cross-country skiing and snowshoeing) is increasing on the North Slope.

The **Stillwater/Hayden** portion is made up of three areas – Hayden Fork, Main Fork and Stillwater drainages. Stillwater Fork is a popular backcountry recreation area because of easy access. Large Boy Scout groups frequent Scow Lake. The Main Fork is an isolated and lightly used drainage with the most concentrated use during the hunting season. There is some motorized trail use primarily in the northwest area.

The **East Fork Bear River** portion of the roadless area is made up of three areas – Lily Lake, Boundary Creek and East Fork Bear River. The Wolverine ATV Trail system occupies much of the Lily Lake portion. Firewood is harvested in this area. In the winter months there is a developed cross-country ski area near Lily Lake with a system of yurts available for overnight use. Anglers use the East Fork Bear River trail to access the river for fishing. Large groups often

camp and fish at Lorena Lake. Boundary Creek has become a very popular area for large groups seeking a backcountry camping experience. It is also popular for fall hunting and cross-country ski use is increasing. Snowmobile use is light except near the head of Boundary Creek.

The **Blacks Fork** area is comprised of East Fork, West Fork, and Middle Fork of the Blacks Fork. West Fork Blacks Fork is heavily used particularly during the fall big game hunt. Summer motorized use is popular along the road paralleling the river, as is snowmobiling in the winter. Most of Middle Fork Blacks has restricted motorized use, but a very low standard and rough road provides access to four-wheel drive and ATV's into the northern end of the area. East Fork Blacks Fork has increasing recreation use supported by nearby facilities. Motorized recreation is prohibited except for snowmobile use in the portion of the area north of the trailhead. The area behind the trailhead is restricted to all motorized use and is managed for semi-primitive non-motorized recreation opportunities.

Cataract creek, Steel Creek Park and North of Bull Park are important snowmobile areas.

East Fork Smiths and West Fork Smiths form the **Smiths Fork** area. East Fork Smiths is near a heavily used road and campgrounds that receives heavy recreation use in the summer and fall. Snowmobile use is popular in the winter and the area has a developed mountain bike trail. Recreational use in West Fork Smiths Fork is very light with some increase occurring during the fall hunt. Snowmobile use in Steel Creek Park and north of Bull Park is very popular. The areas provide excellent snowmobiling opportunities, which are limited on much of the Mountain View District.

The **Henrys Fork/Gilbert Creek** area is similar to the West Fork Smiths Fork with numerous small roads that provide opportunities for development of bike, ATV and cross-country ski trails.

The **Beaver Creek** area can be divided into three fairly distinct areas – Bullocks Park, West Fork Beaver Creek and Middle Fork Beaver Creek. Bullocks Park and West Fork Beaver receives light summer use but increasingly heavy fall hunting use. Motorized use is prohibited except for snowmobiling, which only use the area infrequently.

The **Burnt Fork/Thompson/Kabell** area could be divided into three distinct areas – Thompson/Kabell Creek, Burnt Fork and Beaver Meadows. The Thompson/Kabell Creek area has two popular trails that provide access to the wilderness. Burnt Fork is becoming increasingly popular and receives quite heavy use during the fall hunt. Fishing is very poplar on the scenic stream that has numerous small falls and pools.

Minerals: The majority of the minerals are federally owned. There are about 6,500 acres of privately owned minerals. The Uinta Mountains is considered high in its potential for oil and gas discovery, A substantial amount of the roadless area contains geology that has a high potential for formations known to contain hydrocarbons in other locations. There are 21,000 acres of existing oil and gas leases. **Range:** The area is summer range for numerous cattle and sheep

allotments. Parts of 24 allotments are in the roadless area. There are many range improvements in some areas such as fences and water developments scattered throughout the area. Several low-level maintenance roads are used for motorized access for grazing permittees. **Water:** The Uintas are the headwaters for several of Utah's river systems. Water from the Henrys Fork, Blacks Fork, Bear River, Duchesne River, and Provo River is used for downstream irrigation purposes. The area contributes to the water supply for developed recreation sites such as Meeks Cabin and Stateline Reservoirs. **Land Uses:** The Natural Resource Conservation Service has snow-monitoring sites in the Lily Lake area and south of Steel Creek Park. The Provo Water Users Association has two electronic sites maintained by helicopter and vehicular motorized access in the Duchesne Tunnel area. The Bureau of Reclamation has a weather station near the boundary up the West Fork Blacks Fork. The area does have two sites under special use permit for weather data collection that requires motorized access for maintenance. There is a constructed ditch with a headgate that diverts Thompson Creek water to Hoops Lake. The ditch was constructed with motorized equipment and could require motorized access for maintenance in the future. **Roads and Trails:** There are some motorized trails out of the Wolverine and East Fork of Bear River, as well as the Broadhead Meadows and Murdock Basin areas that are important areas for motorized recreation. A couple of short segments of low maintenance roads designated as open in the Kamas District travel plan are included in the roadless area. The West Fork Blacks Road is closed to the general public and open only for administrative use and a special use weather station permit. There are some designated mountain bike trails near Stateline Reservoir. The Duchesne Tunnel crosses the roadless area underground. Motorized access for maintenance work on the tunnel is gained from outside the area. There is no surface disturbance.

Capability: The area is known for its size, high natural values, pristine and wild landscapes, remarkable scenery, and diverse landscapes. Human activities influence the natural environment near the perimeter, which are adjacent to timber sales, roads, and developed campground and trailheads. This is particularly true close to the North Slope Road. Opportunity for **solitude** is high for much of the area due to the area's large size and dense vegetative screening. **Primitive recreation** opportunities are also excellent because of the vast size and wildness of the area. Diversity of the landscape enhances the area scenic quality. Because of the uniqueness and size of the range, there are high educational and research values. The Middle Fork of Bear, Boundary Creek, Middle Fork Blacks and west Fork Beaver are known as the most pristine and remote areas.

The **Stillwater/Hayden** portion (Hayden Fork, Main Fork and Stillwater drainages) has the most diversity within the roadless area. Hayden Fork has outstanding primitive recreation opportunities. Much of the area has few impacts but its proximity to Highway 150 and developed campgrounds results in sights and sounds of mechanization filtering into the area. Stillwater Fork is similar to Hayden Fork. Scenic quality and primitive recreation opportunities are high away from the campground and summer home area. The Stillwater Fork trail is visited extensively affecting opportunities for solitude. Large groups in the Scow Lake area can diminish one's sense of remoteness. The Main Fork has outstanding scenery and is the most remote of the three drainages.

The naturalness of the environment of **East Fork Bear River** portion of the roadless area (Lily Lake, Boundary Creek and East Fork Bear River) varies significantly from one location to another. The natural environment of the Lily Lake area has been diminished somewhat by the presence of numerous four-wheel drive and ATV trails. Boundary Creek is known for its outstanding primitive recreation opportunities and isolation from nearby developments. The East Fork Bear has many wilderness characteristics present, although use from large groups diminishes solitude in some locations. A variety of habitats attract a multitude of wildlife. Remnants of old tie hack cabins are present.

The **Blacks Fork** area is comprised of East Fork, West Fork, and Middle Fork of the Blacks Fork. The West Fork has outstanding primitive recreation opportunities. The road in the West Fork Blacks Fork is closed to all but administrative use, so solitude and remoteness are rarely affected; most of the area is isolated from concentrated use and development. Past timber harvesting is all but nonexistent with a few old decrepit cabins, decaying stumps and old grown over narrow roads. There is good habitat for wildlife present. Middle Fork Blacks has outstanding primitive recreation opportunities available. There are high opportunities for finding solitude and remoteness in this area. Wilderness characteristics within East Fork Blacks Fork vary greatly. Near the East Fork Blacks Fork Road and in the more northern portion of the drainage solitude and remoteness are diminished. However, south of the East Fork Blacks Fork Guard Station, a deep sense of solitude and remoteness is present.

East Fork Smiths and West Fork Smiths form the **Smiths Fork** area. The West Fork Smiths Fork is a relatively narrow band of the roadless area. Scenery is not unique since most of the area contains extensive stands of lodgepole pine. Opportunities for primitive recreation activities are limited, however one can experience a sense of solitude and remoteness. East Fork Smiths Fork is fairly similar to West Fork Smiths Fork for providing solitude and primitive recreation opportunities. The area is more scenic. Numerous isolated ponds and small wet meadows afford excellent wildlife habitat viewing opportunities.

The **Henrys Fork/Gilbert Creek** area is also similar to the West Fork Smiths Fork. Its proximity to a very popular trailhead results in sights and sounds penetrating into the surrounding roadless area.

Beaver Creek can be divided into three fairly distinct areas – Bullocks Park, West Fork Beaver Creek and Middle Fork Beaver Creek. Bullocks Park is a relatively narrow piece of land lying between a recent timber sale and the wilderness, covered quite extensively by lodgepole pine with limited primitive recreation opportunities. West Fork Beaver is a large area that provides opportunities for primitive recreation. The terrain is diverse and the abundance of various habitats affords a good opportunity to see different wildlife. The Middle Fork Beaver Creek is very similar to the West Fork Beaver Creek.

The **Burnt Fork/Thompson/Kabell** area (Thompson/Kabell Creek, Burnt Fork and Beaver Meadows) are somewhat similar to Beaver Creek. Burnt Fork has somewhat higher scenic quality and could easily be managed as wilderness. Beaver Meadows is also similar to Beaver Creek but more limited in primitive recreation opportunities, much of rest of the year, visitor use is light since scenery is not unique to the North Slope.

The portion of the roadless area on the Kamas District has moderate values of naturalness, solitude, remoteness, and primitive recreation. There are a lot of high elevation wetlands next to alpine country. The naturalness of the environment is somewhat lower near the Mirror Lake Highway and in Murdock Basin ATV network. The sights and sounds of the Mirror Lake corridor and the presence of roads affect solitude, and remoteness. **Special Features or Attractions:** The Uinta Mountains are known for their outstanding scenic qualities. The Uinta Mountain range is unique in that they are the highest range in Utah and the most prominent east-west range in the lower 48 states. There are many segments of streams that were found eligible in the wild and scenic river inventory: Henrys Fork, West Fork Beaver, Thompson Creek, West Fork Blacks, East Fork Blacks, Little East Fork, West Fork Smiths, East Fork Smiths, Stillwater, Hayden Fork, Ostler Fork, Left Hand Fork Bear, Right hand Fork Bear, East Fork Bear and Boundary Creek. The area has an abundant number of species of fish, amphibians, birds and mammals inhabit the Uintas, one of Utah's most biological diverse areas. Area offers important habitat for species at risk like lynx, wolverine, river otter and pine marten, as well as potential habitat for large carnivores such as wolves and grizzly bear, which once existed in the area. The area also has black bear, cougar, deer, elk, moose, fox, badger, weasel, skunk, grouse, and ptarmigan. Several drainages such as Beaver Creek, Burnt have extensive stands of lodgepole pine with numerous pockets of wet meadows and ponds scattered throughout providing for a variety of wildlife habitat where big game species flourish. East Fork Blacks is an important migration corridor for elk. Elk use the higher elevations of the roadless area extensively in the summer. There is a herd of Bighorn Sheep in the Hole-in-the-Rock area. Mountain goats have been have been transplanted to the area. Species at risk include great gray owl, boreal owl, osprey, three-toed woodpecker, goshawk, and boreal toad. Sandhill and whooping cranes and bald eagles migrate through the area. Streams have native Colorado and Bonneville cutthroat trout and rocky mountain whitefish as well as introduced rainbow trout, brook trout and grayling. Plant species at risk are rockcress draba, Uinta beardtongue and Siberian aster. There are several historical and cultural sites from use by American Indians, mountain men, and early pioneers. There are several remnants of the tie hack days. The area has high potential for additional historic tie hacking, logging, and American Indian sites primarily on the Evanston Ranger District.

Manageability: The manageability of the area varies significantly across the landscape from one area to another. Hayden Fork has an easily identifiable boundary though its proximity to concentrated use along Lily Lake Road and Highway 150 would make managing for wilderness challenging. East Fork Bear's terrain and layout of existing roads have isolated the area from the sights and sounds of development. The Bear River-Smiths Fork Trail provides an effective and easy to locate boundary. The terrain of West Fork Black affords manageability of the area for

wilderness characteristics. The remote location and difficult access of Middle Fork Black contributes to its manageability for wilderness characteristics, though the checkerboard land ownership could hinder management as wilderness. East Fork Blacks manageability for wilderness characteristics could be achieved with existing roads and streams used as identifiable boundaries. With relatively limited access, the East Fork Smiths area could be managed for wilderness characteristics. Much of the North Slope road could be used as a boundary. Alternately, manageability for wilderness in the West Fork Smiths, Henrys Fork and Bullocks areas would be hampered by the lack of physical features that could readily identify the boundaries of the area. The narrow corridor of roadless east of Stateline Reservoir and Bridger Lake would be difficult to manage as wilderness. The West/Middle Beaver area lacks outstanding physical features that may be used as a boundary. Areas along significant road exclusions and development (Murdock Basin, Main Fork, Stillwater Fork, East Fork Blacks Fork, East Fork Smiths Fork, Middle Fork Beaver and the oil and gas development area near Dahlgren) could increase potential for non-conforming motorized use.

Need: It is contiguous to the existing High Uintas Wilderness area, the largest wilderness in Utah (over 460,00 acres). The area is located 110 to 150 miles from Salt Lake City and about 30 miles southeast of Evanston, Wyoming. Other local communities include Kamas, Mountain View, Robertson and Lonetree.

The area has received much public interest. This interest has been highly polarized with some people very much in support of wilderness designation and others very much opposed to the idea. The area has received public interest in wilderness designation from both local and national groups. Some view the range as biologically important and an ecological sanctuary, part of an ecosystem complex that connects with the greater Yellowstone ecosystem. By including the existing wilderness and nearby roadless acreage as well as areas on the Ashley National Forest they view the value as a critical corridor as enhanced. They felt wilderness designation would also provide connectivity from sagebrush ecosystems to high alpine country. Others suggest that by increasing the size of the existing wilderness, pressure on other parts of the wilderness will be reduced.

Others have expressed opposition to wilderness designation for several different reasons. There is a growing segment of the public who want an outstanding backcountry experience without the restrictions that accompany a wilderness designation. They desire a place where large groups of more than 14 people can go and have a backcountry experience. Lakes like Baker, Lorena in the Boundary Creek/East Fork Bear area are popular for such large groups.

Snowmobiling groups have expressed a desire to have areas currently open remain open because of the great increase in use of snowmobiling. Many snowmobilers seek wide-open spaces with open steep slopes to challenge and the High Uintas roadless area provides this experience. They feel much of the available terrain is already closed because it is within the wilderness. Like non-motorized users, snowmobilers use and enjoy outstanding, rugged scenery.

Kamas portion of the roadless area has received less public interest when compared to the public interest along the North Slope.

Alternatives and Potential Environmental Effects to Wilderness Character Roadless Area: High Uintas Management Area: West and East Uintas							
Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	98,200	29,300	18,200	0	0	20,100	20,600
Wilderness Character Protected (acres)[1]	98,200	41,600	30,000	0	2,000	29,700	31,400
Trails Closed to Motorized Use From Wilderness Recommendation (miles)	15.2	0	0	0	0	0	0
Motorized Travel Plan Trails Open (miles)	1.1	16.4	16.4	16.4	16.4	16.4	16.4
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescriptions 1.5 + 2.4 + 2.6.

Name: Widdop Mountain #0419020

Acres: Gross: 8,000

Location and Access: The area lies near the Utah – Wyoming state line south of Lone Tree, Wyoming. The area includes Widdop Mountain, the lower Burnt Fork drainage and the area around Coal Mine Hill. Access is primarily by the North Slope Road FS086 and from the north by the Gregory Basin Road (Summit County Road 589).

Setting: The terrain consists of short, steep east-west ridges. The north and west portions of the area are steep ridges with birch-leaf mahogany on southern exposures and dense stands of Douglas fir on the northern exposures. The ridges in the eastern and southern portion extending into the Burnt Fork drainage are vegetated with lodgepole pine. The area also offers rolling grasslands. Elevations range from 8,000 feet in the Burnt Fork drainage to the peak of Widdop Mountain at 9,451 feet.

Availability: Vegetation treatment: There are an estimated 3,400 acres of tentatively suited timber within the area. A past thinning project in the western portion just north of Hole in the Rock is evident. **Recreation:** Recreation use is light with most use occurring during the fall hunting season. Some fishing takes place in the Burnt Fork River. The area is also popular for 4-wheel drive and ATV use. It is used for dispersed camping opportunities. The area is closed to snowmobiles. **Minerals:** The area is located in the Green River Moxa-Arch oil and gas play.

The oil and gas industry rates the area high for oil and gas potential. There are no oil and gas leases currently issued. The area also has known deposits of coal. There were a few past efforts to attempt to mine coal in the area. All of the minerals are federally owned. **Range:** The range allotments have been vacant since bighorn sheep were introduced. The area has two substantial wire wildlife exclosures for vegetation study purposes. **Water:** The area provides irrigation water for Burnt Fork and Mckinnon, Wyoming. **Roads and Trails:** The area includes numerous user-created and low maintenance roads.

Capability: The **naturalness of the environment** is rated moderate influenced by the evidence of user created roads, timber harvest, vegetative treatments and grazing improvements. Opportunities for **solitude** are good especially away from existing roads, since the area has limited access and use is generally low. There are moderate opportunities for **primitive recreation. Challenging experiences** and diversity of opportunities are somewhat limited. **Special Features or Attractions:** The area has some stands of old Douglas fir and sagebrush areas in limestone outcroppings, which are somewhat unique for the North Slope. Thompson Creek was found eligible in the Wild and Scenic River Inventory. Values for wildlife habitat are high. It is an important big game summer and winter range – elk, deer, moose, and bighorn sheep. The area is potential lynx habitat. Burnt Fork has Colorado cutthroat trout, a Forest Service Sensitive Species. The area contains few known heritage sites, but has moderate potential for discovery of historic mining, logging, and American Indian sites. **Manageability**: The area is surrounded by state and private land in the north and northeast creating potential conflicts with nearby non-wilderness uses.

Need: Area is about 60 miles from Evanston and 150 miles from Salt Lake City. The community of Mountain View is about 30 miles away. The High Uintas Wilderness Area, the largest wilderness area in the State of Utah is about 3 miles away (separated by the North Slope Road and the large existing reservoirs). Public opinion on the area is divided. It has not received many comments compared to more popular nearby roadless areas like Lakes and High Uintas. Some have emphasized wilderness to protect ecosystem values for the entire Uinta Mountain range. Others feel this area is needed to meet the growing demand for dispersed motorized recreation opportunities. The area is also important for local community values of traditional Forest uses and recreation.

Alternatives and Potential Environmental Effects to Wilderness Character
Roadless Area: Widdop Mountain
Management Area: Eastern Uintas

Alternative:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Recommended Wilderness (acres)	8,000	0	0	0	0	0	0
Wilderness Character Protected (acres)[1]	8,000	0	0	0	0	0	0
Trails Closed to Motorized Use From Wilderness	0	0	0	0	0	0	0

Recommendation (miles)							
Motorized Travel Plan Trails Open (miles)	0	0	0	0	0	0	0
Motorized Travel Plan Roads Open (miles)	0	0	0	0	0	0	0

1. Prescription 1.5 +2.4 + 2.6.

APPENDIX C-2

Evaluation of Roadless Area Values and Analysis of Effects on Individual Roadless Areas

Evaluation of Roadless Areas

The consideration of how values in roadless areas will be maintained in future forest management was a prominent issue throughout Forest Plan development. The National Roadless Area Conservation Rule of 2001 identified several values that should be considered in forest management (Roadless Area Conservation; 36 CFR Part 294; 66 Federal Register 3244; January 12, 2001). These were soil, water, and air resources; municipal watershed; biodiversity; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large undisturbed areas of land; recreation opportunities in the primitive, semi-primitive non-motorized, and semi-primitive motorized classes; reference landscapes; scenic integrity; traditional cultural properties; sacred sites; and other unique characteristics. The values from the Final Rule were refined for local use by the Wasatch-Cache forest plan interdisciplinary team in collaboration with the Intermountain Region, Caribou-Targhee, and Uinta National Forests. (These are the first 7 values below.) The criteria for assessing values were developed by the interdisciplinary team and are stated below; these criteria are then applied to each roadless area on the Wasatch-Cache to develop a sense of the overall and unique values of each roadless area. Information on which roadless areas were included in this analysis is provided in Appendix C-1.

The value of Size and Context (number 8. below), did not originate in the Final Rule. This value was identified by the interdisciplinary team as an important additional consideration for roadless areas given the team's professional knowledge, recent literature, and public comments that were received throughout this forest planning process.

An assessment of these roadless values for each area is presented directly after the Wilderness evaluation. These value assessments are represented by the numbers 1 through 5, with 1 being low and 5 being high. For some values interdisciplinary team members could only determine low or high values (ie. A score of 1 or 5); for other values, assessments of 1 – low; 3 – medium, or 5 – high value, could be discerned; and finally for a few values the full range of numbers was used: 1 – low, 2 – low-medium, 3 – medium, 4 – medium-high, and 5 – high.

<u>The numbers assigned to represent values were not and are not to be used mathematically; they are simply provided as a code to quickly identify values (from low to high)</u>. Numbers were not added, averaged, or otherwise calculated to determine a relative ranking of roadless areas. Rather, each area was considered as a unique landscape with certain inherent values regarded through the filter of the several

values/criteria provided below. Similarly, values were not ranked within an area in terms of their relative merit. That is – a high value for a fishery is neither higher, nor lower than a high value for a scenic landscape or a watershed.

Individual and collective interdisciplinary team work and judgments led to the determinations in this section, given the values and the criteria listed below as a framework for consideration. The criteria are recognized as imperfect and not a cookbook that could be rigidly applied for determining values. The final assessment is a short narrative put together by the interdisciplinary team that provides information for planners, forest managers, and the public on whether a roadless area had a preponderance of high, medium, or low values. Given this summary of values, the interdisciplinary team and forest management then assess the effects of the several alternatives on these roadless areas in the FEIS and in a record of decision protect and use them appropriately. The summary of values is presented below and in the analysis chapter of the FEIS as part of context setting for the Wilderness/Roadless topic.

Roadless Area Values and Criteria

1. Soils and Water. The value of roadless areas regarding the soil and water resource is based on the presence of extensive areas of wetlands. A high value (5) is assigned for roadless areas that have extensive amount of wetland area. A low value (1) is assigned for roadless having small amounts of wetland.

2. Sources for Public Drinking Water. The Wasatch-Cache supplies drinking water for many communities. The value of roadless areas regarding sources of public drinking water is its location within watersheds that have public water sources that take water directly from a surface source (i.e. stream) downstream of the roadless area. A high value (5) is assigned to roadless areas that have public water sources that take water directly from a surface source (i.e. stream) downstream of the roadless area and a low value (1) is assigned to watersheds that do not.

3. Diversity of Plant and Animal Communities. This value is composed of a number of sub-categories: Properly Functioning Condition (PFC), Plant Species, Terrestrial Species, and Fish Species.

Subcategory 1: Properly Functioning Condition/Evidence of Weeds

A roadless area has higher values for protection if it is closer to properly functioning condition (pfc). Ecosystems are at properly functioning condition when they function within their historic range of variability. For medium-high or high values a consideration of Nature Conservancy identified types in need of protection are made.

PFC Value:

1. Low. - High variance from pfc; high impacts to composition, structure, and/or function (e.g. through livestock grazing and fire control); high amount of noxious weeds.

2. Low-Medium. - Moderate to high variance from pfc; moderate to high impacts to composition, structure, and/or function (e.g. through livestock grazing and fire control); moderate to high amount of noxious weeds.
3. Medium. - Moderate variance from pfc; moderate impacts to composition, structure, and/or function (e.g. through livestock grazing and fire control); low to moderate amount of diversity of plant communities and/or age class diversity; low to moderate amount of noxious weeds.
4. Medium-High. - Low variance from pfc; low impacts to composition, structure, and/or function (e.g. through livestock grazing and fire control); one or more reference landscape communities identified by The Nature Conservancy needs for protection are present; moderate amount of diversity of plant communities and/or age class diversity; low amount of noxious weeds.
5. High. - Area at pfc - area has demonstrative features of composition, structure, and function; and/or several reference landscape communities identified by The Nature Conservancy needs for protection are present; high diversity of communities; and/or communities that represent high age class diversity; and/or communities that are uncommon; no or low noxious weeds and low potential for invasion.

Subcategory 2: Species at Risk (SAR) (includes TECPS – Threatened, Endangered, Candidate, Federally listed and proposed, and State rankings) is identified elsewhere in this analysis. This is not based on numbers alone, but also on rarity.

A roadless area has a higher value for species that are very rare and/or higher numbers of species at risk.

Plant Species Value:
1. Low. - No SAR present.
2. Low-Medium. - SAR present, but relatively low rarity (S2-S3) or no to low threats for disturbance; or habitat that is likely to support SAR plants is present.
3. Medium. - SAR present, and typically S2 rarity with some S3 plants and no to low threats for disturbance; or habitat that is likely to support S1-S2 SAR plants is present.
4. Medium-High. - More than one S2 SAR or one or more S1T1 plants with no known threats.
5. High. - High number of SAR or one or more G1S1T1 plants with known threats.

Terrestrial Species Value:
1. Low. - No habitat for species at risk.
2. Low-Medium. - Habitat present for species at risk.
3. Medium. - Habitat present. Unconfirmed sightings for species at risk.
4. Medium-High. - Sensitive, proposed or candidate species present.
5. High. - Endangered or threatened species present.

Based on the species at risk vertebrates listed in Appendix B-2. Species listed in the evaluation criteria above are the minimum known for a roadless area; other species may

be present as well as habitat for more. See Appendix B-2 to see species possibilities if habitat is available.

Fish Species Value:

1. Low. - No native cutthroat trout meta-populations or streams containing cutthroat trout, no potential for expanding native populations of cutthroat trout.
2. Low-Medium. - No native cutthroat trout meta-populations or streams containing cutthroat trout, potential for expanding native populations of cutthroat trout with treatment.
3. Medium. - No native cutthroat trout meta-populations or streams containing cutthroat trout, potential for expanding native populations of cutthroat trout without treatment.
4. (not used)
5. High. - Native cutthroat trout meta-populations or isolated streams containing cutthroat trout

4. Recreation – Recreation Opportunities Spectrum (ROS). The value is based on relative amount of semi-primitive motorized (SPM) and semi-primitive non-motorized (SPNM) recreation opportunities present. Areas with more semi-primitive recreation would have more value for preservation. The Wasatch-Cache ROS map (2000) for existing opportunities in inventoried roadless areas was used to calculate a percentage of total acres per area composed of SPM and SPNM. While a Primitive (P) experience would also be considered of high value, mapping of the existing recreation opportunities in inventoried roadless areas identified no Primitive ROS acres.

SPM and SPNM ROS Value:

1. Low. - 49%-0% of the area of inventoried roadless area is semi-primitive non-motorized and/or semi-primitive motorized.
2. Low-Medium. – (not used)
3. Medium. - 74%-50% of the area of inventoried roadless area is semi-primitive non-motorized and/or semi-primitive motorized.
4. Medium-High. – (not used)
5. High. - 100%-75% of the area of inventoried roadless area is semi-primitive non-motorized and/or semi-primitive motorized.

5. **Landscape Character and Scenic Integrity.** The landscape character value is based on how intact the inventoried roadless area is as compared to the descriptions of the landscape character theme for natural appearing landscape and existing scenic integrity levels. The inventoried roadless area was considered as a whole. If one part of the area did not meet the description of a scenic integrity level of 5 the area was valued lower as a 4. Scenic Integrity is a measure of the degree to which a landscape is visually perceived to be “complete”. The highest scenic integrity ratings of 5 are given to those inventoried roadless area landscapes which have little or no deviation from the character described in Wasatch-Cache National Forest Natural Appearing Landscape description scenic integrity objective of Very High.

Landscape Character and Scenic Integrity Value:

1. Low. – (not used)
2. Low-Medium. - Low scenic integrity level.
3. Medium. - Moderate scenic integrity level.
4. Medium-High – High scenic integrity level.
5. High. - Very high scenic integrity level.

6. Traditional Cultural Properties. This value recognizes archeological and historic sites and sites sacred to indigenous people. Recorded field data for this value for many roadless areas is scanty on the Wasatch-Cache as little survey work has been done in roadless areas. Professional judgment of the forest heritage specialist is used in estimating the potential value of roadless areas in this respect when field data is absent.

Traditional Cultural Properties Value:

1. Low. – No sites known or very little potential for presence of sites.
2. Low-Medium. – A few sites known or some potential for presence of sites.
3. Medium. – Medium number of known sites or medium potential for presence of sites.
4. Medium-High. – Medium-high number of sites known or medium-high potential for presence of sites.
5. High. - Important sites known or high potential for important sites.

7. Locally Identified Unique Characteristics. The value of local unique characteristics based on the presence of unique geologic, hydrologic, vegetative or other distinctive features. Presence of eligible Wild and Scenic Rivers is noted here. If the feature is noted in other values it is not considered here again. For example, cultural and historical features are discussed above. Areas with a greater number of unique features present have a higher value.

Unique Characteristics Value:

1. Low. – None noted.
2. Low-Medium. – (not used)
3. Medium. – A few unique characteristics present.
4. Medium-High. – (not used)
5. High. – Several to many unique characteristics present.

8. Size and Context. This value was designed to evaluate how important a roadless area is in regard to where it is and how it fits into the landscape it occupies. Size (in Acres) has been determined to be an important factor in protecting wild ecosystems. Some areas are not heavily intruded into by Cherry Stems, others are. Evaluations of cherry stemming were done by looking at GIS projections of each area and counting, measuring, and scrutinizing how much the cherry stems intruded. Some roadless areas are more remote from urban areas or existing developed highways and roads (i.e. have less chance of disruption from visitors, less overall disturbance, and higher potential for ecological integrity without human disruption through use or recreation demand) than others.

An overall score for the value is presented first followed in parentheses by scores for each of the sub-variables. Sub-variables are not of equal importance. Of the listed sub-variables, Size and Acres is most important; Integrity is next most important, then Adjacency and Context. An average score is not calculated for the sub-variables; rather a judgment is made to assign an overall value of Size and Context.

Size and Acres: Larger roadless areas have higher values. For Wasatch-Cache scope only. Based on comparison to other roadless areas on the forest, and considered with proclaimed Wilderness or roadless, if immediately adjacent. Acreages are provided. (Must score 5 in adjacency below).

1. Low. Small (<10,000 acres.)
2. Low-Medium. – Small-Medium (10-15,000 acres)
3. Medium. - Medium (15-20,000 acres)
4. Medium-High. - Medium-Large (20-35,000 acres)
5. High. - Large (>35,000 acres)

Adjacency: Closeness to larger numbers of people may negatively affect roadless character.

1. Low. - Isolated near urban.
2. Low-Medium. – Isolated near rural or within general national forest context.
3. Medium. - Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas.
4. Medium-High. - Surrounded or adjacent to minor roads that separate the area from other undeveloped areas.
5. High. - Immediately adjacent to designated Wilderness.

Context: Relative amount of undeveloped area in a subarea of the Forest, based on looking within four subareas: Bear River Range, Stansbury Range, Wasatch Range, Uinta Mountains.

1. Low. - Much other roadless or Wilderness in section.
2. Low-Medium. - Some other roadless or Wilderness in section.
3. Medium. - Only roadless no Wilderness but RNA in section.
4. Medium-High. - Only roadless but Wilderness and RNAs in section.
5. High. - Only roadless and no Wilderness or RNAs in section.

Integrity: Cherry Stems into an area negatively affect its roadless integrity.

1. Low. - More than 5 and/or very long and intrudes deeply.
2. Low-Medium. - 5 and/or long and moderately intrusive.
3. Medium. - 3 or 4 and/or short and short intrusions.
4. Medium-High. - 1 or 2 and/or very short intrudes almost unnoticeably.
5. None.

Summary Statement. After the individual values of each roadless area are stated, a summary statement is presented for the area that was developed by the forest plan interdisciplinary team. This summary statement is intended to be a general state regarding the value of the roadless area compared with other settings on the Forest.

Effects of Alternatives on Individual Roadless Area

Considerations and disclosures of the effects of alternatives on all roadless areas taken collectively are provided in Chapter 3, Topic 5 of the FEIS.

The effects of the alternatives on roadless area values are largely shown by four tables for each roadless area that give the acres by alternative for:

- Management Prescriptions
- Recreation Opportunity Spectrum (ROS) category
- Motorized or Non-Motorized Winter Recreation (and Heliski if applicable)
- Categories of Management Prescriptions that Maintain Values, Mostly Maintain Values, or Allow Development

These several allocations give a good indication of the intent of management for each area as they are conceived in the alternative, and the potential for affecting roadless area values.

For the ROS and Winter Recreation tables, columns are shown for both the existing on the ground condition of current use, as well as for Alternative 4, (mapped as intended for the 1985 Forest Plan.)

Heliski operations are only allowed or not allowed in those roadless areas where there is an accounting in the tables for them. In all other roadless areas no heliski operations are allowed under any alternative. Areas where heliski operations are allowed may overlay areas where snowmobile use is allowed or winter non-motorized areas.

Acreage totals are not provided for the MPC, ROS and Winter Recreation tables, and acreage figures for each roadless area are rounded off to the nearest 100 acres. In the DEIS acreage figures were shown to the nearest acre, however, the GIS mapping accuracy for these areas was not accurate to that degree across the several alternatives. It is thought that rounding provides a more appropriate realistic approximation of the acreage for these roadless areas. Areas may be said to be within 100 acres of the area presented in the tables.

The intent of the effects analysis is to show how different the allocations for the roadless areas are across the alternatives, and with that the potential effects of these allocations to either development or maintenance of roadless value. Also, for the ROS and Winter Recreation tables the 1985 Forest Plan columns will often sum to a considerably different

total acreage than other alternative columns due to changes in the ownership of the forest since 1985 through land acquisitions or exchanges.

Finally, there is a short narrative with more interpretation of the effects of the alternatives for those roadless areas that had high value overall: Mt. Naomi, Upper South Fork, Stansbury, Lakes, High Uintas. See FEIS, Chapter 3, Topic 5 for a listing of high, medium, and low value roadless areas. Also, rationale is given in Chapter 3, Topic 5 to group management prescriptions into those that maintain roadless values, mostly maintain roadless values, or allow development is applied to high value roadless areas.

Cache-Box Elder Management Area

Gibson

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - Most of this roadless area is not grazed (The eastern portion is in a sheep allotment). Most of the area is dominated by aspen and aspen-conifer communities with scattered mixed conifer, Douglas-fir, and sagebrush communities. Some Canada thistle is present in this roadless area.
- Vegetation Species at Risk - 2 - Arabis glabra var. furcatipilis occurs in this roadless area, while habitat for Wasatch rockcress is present
- Terrestrial Species at Risk – 3 – Lynx linkage habitat present. Unconfirmed wolverine sighting.
- Fish Species at Risk -5 - This area contains parts of the Logan River and its tributaries that contain cutthroat trout.
- ROS – 3- 11% SPM, 59% SPNM.
- Landscape Character and Scenic Integrity – 4 - No remnants of forest harvest that do not mimic natural lines found in the landscape. Some ghost roads/trails evident. Scenic Attractiveness Level: Common
- Heritage Resources – 2 - Survey data primarily around Beaver Ski Area. Sites are potentially around Logan River, but low possibility overall.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 2 - (Acres and Size: 2. Medium Small (5347 (WCNF) + 8500 (CBNF) =13,847 acres) (Acreage includes adjacent CBNF roadless.) Adjacency: 2. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Bear River Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 2. 1 or 2 and/or very short intrudes almost unnoticeably.

Summary Statement

- Most values are low to medium. High value for fish.

Effects on Individual Roadless Area

Gibson– Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	0	0	0	0	0	0	0
2.5	200	200	200	300	300	200	200
2.6	4,700	0	0	0	0	0	0
3.1	400	5,100	400	0	0	400	0
3.1A	0	0	0	0	0	0	400

3.2	0	0	0	0	0	4,700	0
3.2U	0	0	0	0	0	0	4,700
4.1	0	0	0	0	0	0	0
4.4	0	0	0	100	0	0	0
5.1/6.1	0	0	4,700	0	0	0	0
5.2	0	0	0	4,900	0	0	0
5.2/6.2	0	0	0	0	5,000	0	0
6.2	0	0	0	0	0	0	0

Gibson – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	3,200	0	0	0	0
Rural	0	0	0	100	0	0	0	0
RN	1,800	1,800	1,900	2,100	1,800	2,200	1,600	1,600
SPM	500	500	500	0	500	0	600	600
SPNM	3,000	3,000	3,000	0	3,000	3,100	3,100	3,100

Gibson – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	5,300	2,200	5,300	4,300	2,900	4,400
Snowmobile Not Allowed	5,300	5,300	0	0	0	1,000	2,400	1000

Gibson – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	5,300	5,300	400			200	
Mostly Maintains Roadless Values			0			5,100	5,100
Allows Development			4,900	5,300	5,300	0	200
Sum	5,300	5,300	5,300	5,300	5,300	5,300	5,300

Mount Naomi

Inventory of Values

- Soil and Water - 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - No surface sources of public drinking water are downstream of roadless area except the surface water of the lower part of Green Canyon supplies public drinking water to North Logan.
- Properly Functioning Condition – 4 - This roadless area includes representative stands of the Douglas-fir/Ninebark habitat type, which has been identified by The Nature Conservancy as a type in need of protection in the Intermountain Region.

Dyers woad is primarily confined to lower elevations within this roadless area and is common on the western portions in Logan Canyon and Green Canyon.

- Vegetation Species at Risk - 5 - Cache beardtongue, Rydbergs musineon, Frank Smith violet, Maguires primrose, Maguires draga, Wasatch rockcress, Cronquest daisy, and Logan buckwheat are present within this roadless area.
- Terrestrial Species at Risk – 4 - Townsend' big-eared bat present. Linkage habitat for lynx, and habitat for goshawk, Northern three-toed woodpecker and others.
- Fish Species at Risk - 5 - This area contains parts of the Logan River mainstem and tributaries that contain cutthroat trout.
- ROS – 5 - 32% SPM, 46% SPNM.
- Landscape Character and Scenic Integrity – 4 - Preston Valley staging area is included in this area adjacent to Highway 89. Scenic Attractiveness Level: Distinct
- Heritage Resources – 3 to 4 - Little data, but Logan River is a major corridor and the presence of continuous water sources suggest cultural resources presence.
- Unique Characteristics – 5 - Several features present including Logan and Wind caves and other limestone caverns, Jardine Juniper, oldest known tree of this species. Portions of three streams found eligible in the wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 4 - (Acres and Size: 5. Large (45,122 WCNF roadless + 44,350 Mt. Naomi Wilderness +28,800 CBNF roadless = 118,272 acres). Adjacency: 4. Surrounded or adjacent to minor roads that separate the area from other undeveloped areas. (Mt. Naomi roadless is both near urban, Logan Canyon Highway, but also immediately adjacent to other large roadless and designated Wilderness, an interpolated score of 4 was judged for this factor.) Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive.)

Summary Statement

- Mostly medium-high to high values. Public drinking water in lower part of Green Canyon, PFC, vegetation SAR, fish SAR, semi-primitive experience and unique characteristics have high value.

Effects on Individual Roadless Area

Mount Naomi – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	40,000	20,300	8,200	0	0	8,200	500
2.5	2,300	2,300	2,300	2,700	3,300	2,300	2,300
2.6	600	18,200	0	0	0	25,700	33,400
3.1	1,000	2,300	5,900	3,600	3,400	6,300	0
3.1A	0	0	0	0	0	0	2,900
3.1W	0	0	0	0	0	0	3,400
4.1	0	1,100	19,600	13,100	500	0	0
4.4	1000	800	900	2,700	900	2,400	2,400
5.2	0	0	0	16,200	7,700	0	0

5.2/6.2	0	0	0	0	29,200	0	0
6.1	0	0	8,000	0	0	0	0
6.2	0	0	0	6,700	0	0	0

Mount Naomi – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	12,900	0	0	0	0
Rural	1,200	1,200	1,200	100	2,500	1,200	0	0
RN	3,200	6,200	8,400	12,600	8,600	9,700	9,500	9,500
SPM	2,000	3,200	3,200	2,300	3,200	1,900	3,200	3,200
SPNM	38,600	34,300	32,200	17,000	30,600	32,200	32,200	32,200

Mount Naomi – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	100	29,100	20,500	44,300	23,200	14,700	28,300
Snowmobile Not Allowed	45,000	44,800	15,900	11,600	600	21,800	30,300	16,700

Mount Naomi – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	45,000	43,100	14,100			36,300	33,900
Mostly Maintains Roadless Values		1,100	19,600	13,100	500	6,300	6,300
Allows Development		800	11,200	31,800	44,500	2,400	4,800
Sum	45,000	45,000	45,000	44,900	45,000	45,000	45,000

Additional Comments on Effects for High Value Roadless Area

In Alternatives 1, 2, and 6 the intent of the Roadless Areas Conservation Rule is applied and neither timber harvest nor road construction is allowed.

In every Alternative, a band of MPC 2.5 is applied to about 2,300 to 3,200 acres (5-7% of the roadless area) along the Logan Canyon Highway to protect outstanding scenic qualities of the Scenic Byway. Development is allowed in this acreage.

In Alternative 1 nearly all of the Mt. Naomi roadless area is recommended for Wilderness and roadless values are protected. Only existing cherry stems roads in Green Canyon and to Tony Grove Lake provide motorized access into the core of the area, and any other development is not allowed.

In Alternative 2 a recommendation for Wilderness of slightly less than half of the roadless area in the southern part of the area provides protection for roadless values. In the northern part of the area more than half of the roadless area's values are maintained

with an MPC of 2.6. Less than 2% of the area allows development, mostly in the Green Canyon road corridor, and about 2.5 % of the roadless area on its east side just north of White Pine Creek allows new trail construction.

In Alternative 3, 31% of Mt. Naomi roadless character is maintained. 8,200 acres in the southern portion of the area adjacent to Mt Naomi Wilderness is recommended as an addition to that Wilderness. On the northern side of the area MPC 4.1 is applied to provide for backcountry summer non-motorized recreation to nearly half the roadless area. Most of the Green Canyon watershed is maintained in a roadless character by MPC 3.1, while the road corridor is managed for dispersed motorized recreation. Stringers of MPC 3.1 also are commonly applied along streams in the area to protect metapopulations of Bonneville Cutthroat trout and stream habitat. 8,000 or 18% of the area on its southeastern side is allocated to MPC 6.1, where emphasis on non-forested vegetation allows road construction and a variety of potential treatment types to improve vegetative conditions.

In Alternative 4 about ¾ of the Mt. Naomi roadess area allows development, with an MPC of 5.2 for forested vegetation management for timber growth and yield on 36% of area's northeastern side. 29% of the area on its east and south sides is managed for backcountry non-motorized recreation, and an MPC of 6.2 is applied to livestock forage production for 15% of the area. The Green Canyon watershed is managed as an important watershed by MPC 3, while allowing changes to roadless character as needed to reach watershed objectives. The Green Canyon road corridor is managed for dispersed motorized recreation.

In Alternative 5 almost all of the roadless area is managed under prescriptions that allow development. Either forested vegetation management for timber growth and yield or rangeland vegetation management for livestock forage production is applied to about 2/3 of the area. The remaining 1/3 of the area is composed of a 7,700 acre block adjacent to the south side of the Mt. Naomi Wilderness that is managed for livestock forage production, while the Green Canyon area is managed as in Alternatives 3,4,6, and 7.

In Alternative 6, roadless values are maintained on 81% of the Mt. Naomi roadless area, primarily by a large MPC 2.6 on 25,700 acres on the east and north sides of the area, and also by a Wilderness recommendation of 8,200 acres on the south margin of Mt. Naomi Wilderness. Stringers of MPC 3.1 are applied to streams to provide for Bonneville cutthroat trout metapopulations and habitat, while the Green Canyon area is managed as in Alternatives 3,4,5, and 7.

In Alternative 7, there is no recommendation for Wilderness for portions of the Mt. Naomi roadless area, but about ¾ of the roadless area's values are protected by an application of the 2.6 MPC. A corridor for dispersed motorized recreation is recognized along the northern stretches of the Logan River with MPC 4.4 on 2,400 acres (5% of the area), stringers of 3.1 are applied to streams with metapopulations of Bonneville cutthroat trout for their protection, and, and Green Canyon is managed as in Alternatives 3-6.

Temple Peak

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition –2 - The Temple Peak roadless area is dominated by a variety of plant communities, including aspen, Douglas-fir, mixed conifer, lodgepole pine, mountain mahogany, and sagebrush. Most of this area is covered by grazing allotments; some portions show impacts from historic grazing. Dyers woad is a component is many portions especially on the lower, western portions of the area, while hemlock, Canada thistle, field bindweed and whitetop also occur.
- Vegetation Species at Risk - 3 - Wasatch rockcress and clustered lady's slipper occur within this roadless area. In addition, habitat for Arabis glabra var. furcatipilis is present.
- Terrestrial Species at Risk – 4 - Lynx linkage habitat present. Flammulated owl, goshawk, Northern three-toed woodpecker present.
- Fish Species at Risk -5 - This area contains parts of the Logan River mainstem and tributaries that contain cutthroat trout.
- ROS –5- 26% SPM, 49% SPNM.
- Landscape Character and Scenic Integrity – 4 - Some ghost roads; it appears that there have been timber sales in the past. Adjacent to the Sinks Road. Scenic Attractiveness Level: Common
- Heritage Resources – 3 - Known prehistoric sites along Logan River. Also includes Temple Fork Sawmill site. Moderate potential for more sites.
- Unique Characteristics – 3 - Portions of five streams found eligible in wild and scenic inventory. Segment of the Great Western Trail present.
- Size and Context - Overall Score for Size and Context – 2 – (Acres and Size: 3. Medium (23,379 acres). Adjacency: 3. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Bear River Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive.)

Summary Statement

- Most values are low to medium, except fish SAR and semi-primitive experience that are high.

Effects on Individual Roadless Area

Temple Peak – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.5	1,300	1,300	1,300	1,700	1,700	1,300	1,300
2.6	19,900	0	0	0	0	0	0

3.1	1,900	21,800	1,900	0	0	1,900	0
3.1A	0	0	0	0	0	0	1,900
3.2	0	0	0	0	0	19,800	0
3.2U	0	0	0	0	0	0	19,600
4.3	100	100	100	0	100	100	100
4.4	200	200	200	0	200	200	200
5.1	0	0	0	0	0	100	300
5.1/6.1	0	0	19,900	0	0	0	0
5.2	0	0	0	15,200	0	0	0
5.2/6.2	0	0	0	0	21,400	0	0
6.2	0	0	0	6,500	0	0	0

Temple Peak – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	3,200	0	0	0	0
RN	5,800	5,800	5,800	20,200	12,400	5,800	5,800	5,800
SPM	6,100	6,100	6,100	0	6,100	6,100	6,100	6,100
SPNM	11,500	11,500	11,500	0	4,900	11,500	11,500	11,500

Temple Peak – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	1000	0	20,000	20,200	23,400	18,500	15,800	20,200
Snowmobile Not Allowed	22,400	23,400	3,400	0	0	4,900	7,600	3,200

Temple Peak – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	23,400	23,100	1,900			1,300	
Mostly Maintains Roadless Values		100				21,900	21,500
Allows Development		200	21,500	23,400	23,400	200	1,900
Sum	23,400	23,400	23,400	23,400	23,400	23,400	23,400

Mount Logan North

Inventory of Values

- Soil and Water – 1- Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 4 - This roadless area includes all of the proposed Logan Canyon Special Interest Area (SIA) which includes representative stands of the Douglas-fir/Ninebark habitat type, which has been

identified by The Nature Conservancy as a type in need of protection in the Intermountain Region. Dyers woad is a common noxious weed in this area.

- Vegetation Species at Risk - 5 - This roadless area includes several plant species at risk (SAR) including Arabis glabra var. furcatipilis, Maguires draba, Rydberg's musineon, Cache beardtongue, Maguires primrose, and Frank Smith violet. In addition, habitat for the nearby occurring Beckwith violet is present.
- Terrestrial Species at Risk – 2 - Lynx linkage habitat present.
- Fish Species at Risk -5 - This area has an isolated population of cutthroat trout in Spring Creek
- ROS – 5 – 23% SPM, 62% SPNM.
- Landscape Character and Scenic Integrity – 4 - Old timber harvest in southwest portion of this roadless area. Utility corridors on north, east and west sides. Scenic Attractiveness Level: Distinct
- Heritage Resources – 2 to 3 - Little data - low to moderate potential primarily depending on steep slopes. River valleys have greater potential for sites.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context - 2 – (Acres and Size: 3. Medium (19,197 acres) Adjacency: 1. Isolated near urban. Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 3. 3 or 4 and/or short and short intrusions.)

Summary Statement

- Some high values especially fish SAR, PFC, vegetation SAR, semi-primitive experience, scenic integrity.

Effects on Individual Roadless Area

Mount Logan – North – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.5	900	900	900	1000	1000	900	900
2.6	6,500	0	0	0	0	0	0
2.7	11,300	11,300	0	0	0	11,300	11,300
3.1	200	200	200	0	0	6,700	0
3.1A	0	0	0	0	0	0	200
3.1W	0	0	0	0	0	0	6,500
3.2	0	6,400	17,800	0	0	0	0
4.3	300	300	300	0	400	300	300
5.2	0	0	0	0	5,800	0	0
6.1	0	0	0	6,700	0	0	0
6.2	0	0	0	11,500	12,100	0	0

Mount Logan – North – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	300	0	0	0	0
Rural	3,000	3,000	3,000	500	3,000	3,000	0	0
RN	300	300	300	5,900	800	300	3,000	3,000
SPM	4,300	4,300	4,300	12,500	3,800	4,300	4,300	4,300

SPNM	11,600	11,600	11,600	0	11,600	11,600	11,900	11,900

Mount Logan – North – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	14,000	18,900	19,200	11,800	9,200	18,500
Snowmobile Not Allowed	19,200	18,900	5,200	0	0	7,400	10,000	700

Mount Logan – North – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	19,200	18,900	18,000			12,200	
Mostly Maintains Roadless Values		300				7,000	18,000
Allows Development			1,200	19,200	19,200		1,200
Sum	19,200	19,200	19,200	19,200	19,200	19,200	19,200

Mount Logan South

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - Juniper interspersed with sagebrush is a common component of the west- and south-facing slopes in this roadless area. Douglas-fir is common on the north-facing slopes. Aspen communities are common at upper elevations. Dyers woad is a common component of the lower, drier sites in this area.
- Vegetation Species at Risk – 2 – This roadless area includes one plant species at risk, Kings woodyaster, which is of moderate rarity.
- Terrestrial Species at Risk – 2 - Lynx linkage habitat present.
- Fish Species at Risk -5 - This area has an isolated population of cutthroat trout in the Left Hand Fork of the Blacksmith Fork.
- ROS – 5 – 41% SPM, 48% SPNM.
- Landscape Character and Scenic Integrity – 4 – Cherry stems into roadless area along several roads. Utility corridors on north, and south. Scenic Attractiveness Level: Common
- Heritage Resources – 2 to 3 - Little data available, but low to moderate potential primarily depending on steepness of slopes.
- Unique Characteristics – 1 - None identified.

- Size and Context - Overall Score for Size and Context – 2 – (Acres and Size: 3. Medium (17,001 acres) Adjacency: 2. Isolated near rural or within general national forest context. Context: Bear River Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive.)

Summary Statement

- Most values are medium. Fish, scenic integrity and semi-primitive experience values are high.

Effects on Individual Roadless Area

Mount Logan – South – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	15,900	0	0	0	0	0	0
2.7	200	200	0	0	0	200	200
3.1	0	15,900	0	0	0	15,900	0
3.1W	0	0	0	0	0	0	15,900
3.2	100	200	16,200	0	0	100	0
3.2U	0	0	0	0	0	0	100
4.3	500	500	500	0	500	500	500
4.4	300	100	300	0	300	300	300
6.1	0	0	0	1,700	0	0	0
6.2	0	0	0	15,300	16,200	0	0

Mount Logan – South – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	600	0	0	0	0
RN	1,900	1,900	1,900	9,400	2,300	1,900	1,900	1,900
SPM	5,300	5,300	7,000	7,000	6,600	7,000	7,000	7,000
SPNM	9,800	9,800	8,100	0	8,100	8,100	8,100	8,100

Mount Logan – South – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	17,000	16,400	17,000	17,000	11,100	17,000
Snowmobile Not Allowed	17,000	17,000	0	0	0	0	5,900	0

Mount Logan – South – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	17,000	16,300	16,200			200	
Mostly Maintains		500				16,500	16,200

Roadless Values							
Allows Development		100	800	17,000	17,000	300	800
Sum	17,000	17,000	17,000	17,000	17,000	17,000	17,000

Mount Logan West

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - Juniper interspersed with sagebrush is a common component of the west- and south-facing slopes in this roadless area. Douglas-fir is common on the north-facing slopes. At upper elevations, subalpine fir dominates with scattered inclusions of aspen. Dyers woad is a common noxious weed in this area.
- Vegetation Species at Risk - 2 - No known SAR plants occur within this roadless area, however, habitat for the nearby occurring Beckwith violet is present at the lower elevations, while habitat for King's woodyaster occurs at the upper elevations.
- Terrestrial Species at Risk – Score for Criteria – 2 - Lynx linkage habitat present.
- Fish Species at Risk - 2 - Habitat is available in Spring Creek. The stream would have to be treated to remove brown trout
- ROS – 5 – 16% SPM, 84% SPNM.
- Landscape Character and Scenic Integrity – 4 - Has gravel pit in the middle of area, some ghost roads. Scenic Attractiveness Level: Common.
- Heritage Resources – 2 to 3 - Little data - low to moderate potential primarily depending on steep slopes.
- Unique Characteristics – 1 - None identified.
- Overall Score for Size and Context – 2 – (Acres and Size: 1. Small (5,281 acres). Adjacency: 3. Isolated near rural or within general national forest context. Context: Bear River Range. 1. Much other roadless or Wilderness in section

Summary Statement

- Most values are low to medium, except semi-primitive experience that is high.

Effects on Individual Roadless Area

Mount Logan – West – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	4500	0	0	0	0	0	0
3.2	0	4500	4500	0	0	4500	0
3.2U	0	0	0	0	0	0	4500

4.3	700	700	700	0	700	700	700
6.1	0	0	0	4300	0	0	0
6.2	0	0	0	900	4500	0	0

Mount Logan – West – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	4,300	0	0	0	0
Rural	500	500	500	0	500	500	0	0
RN	0	0	0	300	0	0	0	0
SPM	800	800	800	700	800	800	800	800
SPNM	4,000	4,000	4,000	0	4,000	4,000	4,400	4,400

Mount Logan – West – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	100	100	5,300	1,000	5,300	5,300	3,500	5,300
Snowmobile Not Allowed	5,200	5,200	0	0	0	0	1,800	0

Mount Logan – West – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	5,300	4,500	4,500				
Mostly Maintains Roadless Values		700				5,300	4,500
Allows Development			700	5,300	5,300		700
Sum	5,300	5,300	5,300	5,300	5,300	5,300	5,300

Boulder Mountain

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - The area is dominated by mountain mahogany, sagebrush and aspen plant communities. Portions of three allotments occur in this roadless area and the area shows some impacts from grazing. Dyers woad occurs on the southern portion of this area and Canada thistle and hemlock occur in the Left Hand Fork Blacksmith Fork riparian area adjacent to this roadless area.

- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 4 - Goshawk and Northern three-toed woodpecker present.
- Fish Species at Risk -5 - This area has an isolated population of cutthroat trout in Saddle Creek
- ROS – 5 – 25% SPM, 75% SPNM.
- Landscape Character and Scenic Integrity - 3 – North edge of roadless area appears to have several geometric vegetation patterns, but it is on south-facing slopes. Scenic Attractiveness Level: Distinct to Common: Blacksmiths Fork Canyon rock spires and distinct vegetation patterns.
- Heritage Resources – 3 - No survey data, rank based on professional judgment of presence of cultural resources.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 2 - Acres and Size: 1. Small (8,845 acres) Adjacency: 4. Surrounded or adjacent to minor roads that separate the area from other undeveloped areas. Context: Bear River Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems. 1. 5 and/or long and moderately intrusive. (Only 1 cherry stem – 2 miles)

Summary Statement

- Most values are low to medium, except fish SAR and semi-primitive experience which high.

Effects on Individual Roadless Area

Boulder Mountain – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	8,300	0	0	0	0	0	0
3.1	0	5,800	0	0	0	0	0
3.2	0	2,700	0	0	0	100	0
3.2U	0	0	0	0	0	0	100
4.3	100	300	400	0	400	400	400
4.4	400	0	100	0	100	100	100
5.1/6.1	0	0	8,300	0	0	8,300	8,300
5.2/6.2	0	0	0	0	8,300	0	0
6.2	0	0	0	8,800	0	0	0

Boulder Mountain – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	200	200	200	8,800	900	200	200	200
SPM	2,300	2,300	2,300	0	1,700	2,100	2,100	2,100
SPNM	6,400	6,400	6,400	0	6,200	6,500	6,500	6,500

Boulder Mountain – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	8,200	8,800	8,800	8,800	7,900	8,800
Snowmobile Not Allowed	8,800	8,800	700	0	0	0	900	0

Boulder Mountain – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	8,800	8,500					
Mostly Maintains Roadless Values		300				8,700	100
Allows Development		0	8,800	8,800	8,800	100	8,800
Sum	8,800	8,800	8,800	8,800	8,800	8,800	8,800

Elk Valley

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 1 - This roadless area is dominated by aspen communities with inclusions of sagebrush, Douglas-fir, and mixed conifer. Portions of four allotments cover this roadless area. Many of the aspen and sagebrush communities show impacts of historic grazing. Dyers woad is present on the western portion of this roadless area.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 4 - Goshawk and Northern three-toed woodpecker present.
- Fish Species at Risk - 5 -This area contains isolated populations of cutthroat trout.
- ROS – 5- 88% SPM, 0 % SPNM.
- Landscape Character and Scenic Integrity – 3 - High amount of ghost roads/trails and road # 20248 bisects the roadless area. Scenic Attractiveness Level: Common.
- Heritage Resources - 3 - Low survey data, but moderate potential for prehistoric sites near springs.
- Unique Characteristics – 1 – None identified.
- Size and Context - Overall Score for Size and Context – 1 - Acres and Size: 1. Small (8,839 acres). Adjacency: 4. Surrounded or adjacent to minor roads that separate the area from other undeveloped areas. Context: Bear River Range, 1.

Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. More than 5 and/or very long and intrudes deeply. (Area has 3 cherry stems – 1 very intrusive, over two miles long with donut hole along course. Trails network the area. State inholding.)

Summary Statement

- Most values are low. High values for fish and motorized semi-primitive experience.

Effects on Individual Roadless Area

Elk Valley – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
3.2	8,000	8,000	0	0	0	7,900	0
3.2U	0	0	0	0	0	0	7,900
4.3	200	200	200	0	200	200	200
5.1/6.1	0	0	8,000	0	0	100	100
5.2	0	0	0	2,200	0	0	0
5.2/6.2	0	0	0	0	8,000	0	0
6.2	0	0	0	6,000	0	0	0

Elk Valley – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	400	400	400	8,200	1,000	400	400	400
SPM	7,800	7,800	7,800	0	7,200	7,800	7,800	7,800

Elk Valley – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200
Snowmobile Not Allowed	0	0	0	0	0	0	0	0

Elk Valley – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	8,200	8,000					
Mostly Maintains Roadless Values						8,200	7,900
Allows Development		200	8,200	8,200	8,200		300
Sum	8,200	8,200	8,200	8,200	8,200	8,200	8,200

Mahogany Range

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 2 - The Mahogany Range roadless area is dominated by curlleaf mountain mahogany with scattered juniper and sagebrush communities on south-facing slopes and Douglas-fir on north-facing slopes. Some aspen stands are present at higher elevations, but are being replaced by conifers. Most of the area is in a cattle allotment and shows some evidence of historic grazing. Dyers woad is common on this allotment.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 2 - Goshawk, Northern three-toed woodpecker, and flammulated owl habitat present.
- Fish Species at Risk -5 - Cutthroat trout are found the Left Hand Fork of the Blacksmith Fork.
- ROS – 5 – 21% SPM, 64% SPNM.
- Landscape Character and Scenic Integrity – 3 - In the mid-section of this area the vegetation patterns are very geometric explaining the number of unconstructed traverlways in the area. Scenic Attractiveness Level: Distinct. A unique complex of vegetation types and terrain.
- Heritage Resources – 3 - Low data, but moderate potential of sites based on amount of springs and creeks in area.
- Unique Characteristics – 1 – Small portion of one stream found eligible in the wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context - 2 - Acres and Size: 2. Medium Small (11,400 acres) Adjacency: 2. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Rank 4. Cherry Stems, 1. 5 and/or long and moderately intrusive.

Summary Statement

- Most values are low to medium, except fish SAR and semi-primitive experience, that are high.

Effects on Individual Roadless Area

Mahogany Range – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	6,300	0	0	0	0	0	0
3.1	0	6,900	0	0	0	0	0

3.2	100	4,100	10,400	0	0	10,400	0
3.2U	0	0	0	0	0	0	10,400
4.3	100	300	500	0	500	500	500
4.4	4,900	100	500	0	500	500	500
6.2	0	0	0	11,400	10,400	0	0

Mahogany Range – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	0	0	0	0	0
RN	2,200	2,200	1,700	11,300	2,200	2,200	1,700	1,700
SPM	1,900	1,900	2,400	0	1,900	1,900	2,400	2,400
SPNM	7,300	7,300	7,300	0	7,300	7,300	7,300	7,300

Mahogany Range – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	11,400	11,400	11,400	2,500	900	2,500
Snowmobile Not Allowed	11,400	11,400	0	0	0	8,900	10,500	8,900

Mahogany Range – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	11,400	11,000	10,400				
Mostly Maintains Roadless Values		300				10,900	10,400
Allows Development		100	1000	11,400	11,400	500	1000
Sum	11,400	11,400	11,400	11,400	11,400	11,400	11,400

Right Hand Fork Logan

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 5 - This roadless area includes all of the proposed Logan Canyon Research Natural Area (RNA) which includes representative stands of the Douglas-fir/Ninebark habitat type, which has been identified by The Nature Conservancy as RNA needs on National Forest Lands in Utah (Tuhy 1998). The area includes Dyers woad occurs on the drier slopes near Logan Canyon.
- Vegetation Species at Risk - 5 - This roadless area includes several plant species at risk (SAR) including Rydbergs musineon, Logan buckwheat, Cronquist daisy, Maguires draba, Maguires primrose, and Frank Smith violet.
- Terrestrial Species at Risk – 2 - Goshawk, Northern three-toed woodpecker, lynx linkage and other SAR species habitat present.
- Fish Species at Risk -5 - This area contains parts of the Logan River mainstem and tributaries that contain cutthroat trout.
- ROS – 5 – 36% SPM, 44% SPNM.
- Landscape Character and Scenic Integrity – 3 - Past timber harvest in south part of roadless area. A number of ghost roads are also present. Scenic Attractiveness Level: Distinct. Adjacent to Logan Canyon Scenic Byway.
- Heritage Resources – 3 - Several sites located along Logan Canyon - moderate to high potential to record more
- Unique Characteristics – 3 - Portion of two streams found eligible in the wild and scenic river inventory.
- Size and Context - (Overall Score for Size and Context – 2 - Acres and Size: 3. Medium (15,011 acres). Adjacency: 3. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. More than 5 and/or very long and intrudes deeply. (Area has 6 cherry stems. 4 are small – about .5 miles each. One is deep and forked into two segments in the northern half of the area; Mud Flat-Chicken Creek area. It runs several miles into the area nearly bisecting the northern part of the area.)

Summary Statement

- Some low, medium and high values. PFC, vegetation SAR, fish SAR and semi-primitive experience are high.

Effects on Individual Roadless Area

Right Hand Fork Logan – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.5	600	600	600	800	800	600	600
2.6	11,000	0	0	0	0	0	0
2.7	2,200	2,200	0	0	0	2,200	2,200
3.1	1000	12,000	1000	0	0	1000	0
3.1A	0	0	0	0	0	0	1000
3.2	0	0	0	0	0	5,600	0
3.2U	0	0	0	0	0	0	5,600
4.3	100	100	100	0	200	100	100
4.4	100	100	100	0	100	100	100
5.1/6.1	0	0	13,300	0	0	5,500	5,500
5.2	0	0	0	0	0	0	0
5.2/6.2	0	0	0	0	13,900	0	0
6.2	0	0	0	14,100	0	0	0

Right Hand Fork Logan – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
Rural	0	0	0	100	0	0	0	0
RN	2,900	2,900	2,900	14,900	3,400	2,900	2,900	2,900
SPM	5,400	5,400	6,600	0	6,200	5,400	5,400	5,400
SPNM	6,700	6,700	5,500	0	5,500	6,700	6,700	6,700

Right Hand Fork Logan – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	15,000	15,000	15,000	12,200	14,000	15,000
Snowmobile Not Allowed	15,000	15,000	0		0	2,800	1,000	0

Right Hand Fork Logan – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	15,000	14,800	1000			2,800	
Mostly Maintains Roadless Values		100				12,100	8,800
Allows Development		100	14,000	15,000	15,000	100	6,200
Sum	15,000	15,000	15,000	15,000	15,000	15,000	15,000

Mollens Hollow

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 4 - The Mollens Hollow Research Natural Area (RNA) occurs entirely within and occupies approximately 10 percent of this roadless area. Stands of single needle pinyon pine and curleaf mountain mahogany representing relatively undisturbed conditions occur within this RNA. Some Canada thistle is near the edge of the area as is dyers woad. Dyers woad has the potential to spread if uncontrolled.
- Vegetation Species at Risk - 3 - Maguires draba, Logan buckwheat, and Cache beardtongue occur within this roadless area.
- Terrestrial Species at Risk – 2 - Lynx linkage habitat present.
- Fish Species at Risk -5 - This area has an isolated population of cutthroat trout in Curtis Creek and potential for other populations to be found in the Blacksmith Fork
- ROS – 5 – 38% SPM, 44% SPNM.
- Landscape Character and Scenic Integrity – 4 - Scenic Attractiveness Level: Has a number of prominent rock outcrops and dense conifer.
- Heritage Resources – 2 to 3 - No survey data, rank based on professional judgment of likelihood of presence of cultural resources near springs.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context– 2 - (Acres and Size: 3. Medium (17,676 acres). Adjacency: 2. Isolated near rural or within general national forest context. Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 2. 5 and/or long and moderately intrusive.)

Summary Statement

- Most values are low to medium, except fish SAR and semi-primitive experience that are high.

Effects on Individual Roadless Area

Mollens Hollow – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.4	1,200	1,200	1,200	1,200	1,200	1,200	1,200
2.6	16,200	16,000	0	0	0	0	0
3.1	300	500	300	0	0	500	0
3.1A	0	0	0	0	0	0	500
3.2	0	0	16,200	0	0	15,700	0
3.2D	0	0	0	0	0	0	4,500
3.2U	0	0	0	0	0	0	11,200

4.3	0	0	0	0	0	300	0
4.4	0	0	0	0	0	0	300
5.1	0	0	0	11,100	0	0	0
5.2/6.2	0	0	0	0	16,500	0	0
6.1	0	0	0	5,400	0	0	0

Mollens Hollow – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	4,100	4,100	4,100	11,400	4,100	4,100	3,100	3,100
SPM	5,800	5,800	5,800	0	5,800	5,800	6,800	6,800
SPNM	7,800	7,800	7,800	6,300	7,800	7,800	7,800	7,800

Mollens Hollow - – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	4,400	4,400	11,900	11,400	11,900	11,900	12,600	8,200
Snowmobile Not Allowed	13,300	13,300	5,800	6,300	5,800	5,800	5,100	9,400

Mollens Hollow – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	17,700	17,700	17,700		1,200	1,200	1,200
Mostly Maintains Roadless Values				1,200		16,500	11,700
Allows Development				16,500	16,500	0	4,800
Sum	17,700	17,700	17,700	17,700	17,700	17,700	17,700

Wellsville Mountains

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 2 - Maple communities are common on the Cache Valley portions of this roadless area while juniper communities are common on the western portions in Box Elder County. Two of these units are included in cattle allotments. Dyers woad and leafy spurge have been noted in portions of these widespread units.
- Vegetation Species at Risk - 2 - No known SAR plants are present, but habitats for Beckwith violet, Burkes draba, and Wasatch rockcress are present.
- Terrestrial Species at Risk – 2 - Peregrine falcon habitat present.

- Fish Species at Risk -1 - No cutthroat trout or potential
- ROS – 3 – 47% SPM, 5% SPNM.
- Landscape Character and Scenic Integrity – 3 – Roadless area some has old clearcuts, based on old recovering road locations. Scenic Attractiveness Level: Common
- Unique Characteristics – 1 - None identified.
- Heritage Resources – 4 - No data, but Shoshone tribe described area as high potential for significant Shoshone sites.
- Size and Context - Overall Score for Size and Context – 1 – (Acres and Size: 1. Small (1763 acres. Wellsville Mountain Wilderness = 22,986. Roadless areas are small in relation small-medium sized Wilderness. Not significant in relation to other areas on the Forest.) Adjacency: 2. Isolated near rural or within general national forest context. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive.)

Summary Statement

- Mostly low values except for potential heritage resources.

Effects on Individual Roadless Area

Wellsville Mountains – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	1,700	0	0	0	0	0	0
3.2	100	1,700	300	300	300	1,700	0
3.2U	0	0	0	0	0	0	1,700
5.1/6.1	0	0	1,400	0	0	0	0
6.2	0	0	0	1,400	1,400	0	0

Wellsville – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	0	0	0	0	0
RN	100	1,400	1,500	900	1,500	0	800	800
SPM	0	200	200	500	200	1,700	900	900
SPNM	1,700	200	0	300	0	100	100	100

Wellsville Mountains – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	1,800	1,400	1,800	1,400	1,400	1,800
Snowmobile Not Allowed	1,800	1,800	0	300	0	300	300	0

Wellsville Mountains – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless	1,800	1,800	300			0	0

Values							
Mostly Maintains Roadless Values						1,700	1,700
Allows Development			1,400	1,800	1,800		
Sum	1,800	1,800	1,800	1,800	1,800	1,800	1,800

Bear Management Area

Swan Creek Mountain

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - The Swan Creek Mountain roadless area is dominated by a variety of plant communities from mountain mahogany and sagebrush, to Douglas-fir, mixed conifer, and aspen. This area is included in two sheep allotments. It does not have any major occurrences of noxious weeds, although dyers woad occurs on adjacent lands.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 2 - Lynx linkage habitat present.
- Fish Species at Risk -5 - This area contains parts of the Beaver Creek that contain cutthroat trout
- ROS – 3 – 1 % SPM, 73% SPNM.
- Landscape Character and Scenic Integrity – 3 - Past timber harvest in south part of area. A number of ghost roads are also present. Scenic Attractiveness Level: Common.
- Heritage Resources – 2 to 3 - No data. May have some potential based on proximity to Bear Lake.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 2 – (Acres and Size: 2. Medium-small – (9,384 WCNF roadless acres + 6156 CBNF roadless acres = 15,725 total roadless acres on both forests.) Adjacency: 3. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Bear River Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive. (Two roads – 1: 3 miles long from Highway 89 to and past state line from Willow Spring area. 2: Small incursion less than .5 mile in southwest corner to Amazon Mine area.)

Summary Statement

- Mostly low to medium values, except fish SAR that is high.

Effects on Individual Roadless Area

Swan Creek Mountain – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.5	400	400	400	400	400	400	400
2.6	8,900	0	0	0	0	0	0
3.1	0	8,900	0	0	0	0	0
3.1A	0	0	0	0	0	0	0
3.2	0	0	0	0	0	8,900	0
3.2U	0	0	0	0	0	0	8,900
5.1/6.1	0	0	8,900	0	0	0	0
5.2	0	0	0	4,100	0	0	0
5.2/6.2	0	0	0	0	8,900	0	0
6.2	0	0	0	4,900	0	0	0

Swan Creek Mountain – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	2,500	2,500	2,500	9,400	2,500	2,500	2,400	2,400
SPM	0	0	0	0	6,800	0	100	100
SPNM	6,900	6,800	6,900	0	0	6,800	6,800	6,800

Swan Creek Mountain – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	9,400	9,400	9,400	8,900	6,200	9,400
Snowmobile Not Allowed	9,300	9,300	0	0	0	500	3,200	0

Swan Creek Mountain – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	9,400	9,400	0			400	
Mostly Maintains Roadless Values						8,900	8,900
Allows Development			9,300	9,400	9,400		400
Sum	9,400	9,400	9,400	9,400	9,400	9,400	9,400

Rock Creek – Green Fork

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.

- Properly Functioning Condition – 2 - This roadless area is dominated by a variety of plant communities including Douglas-fir, mixed conifer, aspen, sagebrush, and lodgepole pine. It includes portions of three allotments. Dyers woad is a common component on the lower elevations of this area and black henbane also occurs.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 2 - Lynx linkage habitat present.
- Fish Species at Risk -3- Rock Creek is currently fishless up this high but contains cutthroat trout downstream and could be stocked with native fish.
- ROS – 3 – 52% SPM, 0 % SPNM.
- Landscape Character and Scenic Integrity – 3 - Timber harvest geometric shapes are evident, and ghost roads present. The general appearance is that vegetation is moth-eaten. Scenic Attractiveness Level: Common
- Heritage Resources – 3 - No data, but moderate potential for prehistoric sites near springs.
- Unique Characteristics – 1 - Locally significant small caves present.
- Size and Context - Overall Score for Size and Context – 1 - (Acres and Size: 1. Small (5,651 acres). Adjacency: 2. Isolated near rural or within general national forest context. Context: Rank 3. Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. More than 5 and/or very long and intrudes deeply. (For a very small area this is intruded into heavily by cherry stems – Two major cherry stems intrude about 2 miles each from the eastern edge of the area.)

Summary Statement

- All low values except for fish SAR, semi-primitive experience and heritage which are medium.

Effects on Individual Roadless Area

Rock Creek – Green Fork – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	5,500	5,500	0	0	0	0	0
3.1	100	100	100	0	0	100	0
3.1A	0	0	0	0	0	0	100
3.2	0	0	5,500	0	0	5,000	0
3.2U	0	0	0	0	0	0	5,000
4.3	0	0	0	0	0	500	0
4.4	0	0	0	0	0	0	500
5.1	0	0	0	5,600	0	0	0
5.2/6.2	0	0	0	0	5,600	0	0

Rock Creek – Green Fork – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	2,300	2,300	2,300	5,600	2,300	2,300	2,700	2,700

SPM	100	800	3,300	0	3,300	200	2,900	2,900
SPNM	3,300	2,500	0	0	0	3,100	0	0

Rock Creek – Green Fork – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	2,000	2,000	5,600	5,600	5,600	5,600	5,600	5,600
Snowmobile Not Allowed	3,600	3,600	0	0	0	0	0	0

Rock Creek – Green Fork – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	5,600	5,600	5,600				
Mostly Maintains Roadless Values						5,600	5,100
Allows Development				5,600	5,600		500
Sum	5,600	5,600	5,600	5,600	5,600	5,600	5,600

Sugar Pine

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 2 - This roadless area is dominated by aspen, sagebrush, and Douglas-fir, with spruce-fir at the higher elevations. The area is included in an allotment that shows evidence of grazing and fire suppression (aspen being replaced by conifer at an accelerated rate). Canada and musk thistle are common in the riparian portions of this roadless area and dyers woad occurs on adjacent lands.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 2 - Goshawk and lynx linkage habitat present.
- Fish Species at Risk - 5 - This area contains parts of the Sugar Pine Creek that contain cutthroat trout.
- ROS – 5 – 23% SPM, 65% SPNM.
- Landscape Character and Scenic Integrity – 3 – Large number of ghost roads. Scenic Attractiveness Level: Common.
- Heritage Resources – 2 to 3 - No survey data, score based on professional judgment of resource potential.
- Unique Characteristics – 1 - None identified.

- Size and Context - (Overall Score for Size and Context – 1 - (Acres and Size: 1. Small (5,591 acres). Adjacency: 2. Isolated near rural or within general national forest context. Context: Bear River Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems. 1. 5 and/or long and moderately intrusive. (Three cherry stems – the longest of which is about 1.5 miles up from the areas southwest corner. The other two are less than .5 miles each. This is moderate to heavy intrusion for a small area.)

Summary Statement

- Mostly low values except fish SAR and semi-primitive experience that are high.

Effects on Individual Roadless Area

Sugar Pine – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	4,900	0	0	0	0	0	0
3.1	700	5,600	5,600	0	5,600	5,200	0
3.1W	0	0	0	0	0	0	5,200
3.2	0	0	0	0	0	0	0
4.2	0	0	0	0	0	0	0
4.4	0	0	0	0	0	400	400
4.5	0	0	0	0	0	0	0
6.1	0	0	0	5,600	0	0	0

Sugar Pine – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	0	700	700	500	1,900	1,900	700	700
SPM	1,900	1,300	1,700	5,100	3,700	0	1,300	1,300
SPNM	3,700	3,700	3,100	0	0	3,700	3,700	3,700

Sugar Pine – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	5,600	5,600	5,600	5,600	5,600	5,600
Snowmobile Not Allowed	5,600	5,600	0	0	0	0	0	0

Sugar Pine – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	5,600	5,600	5,600				
Mostly Maintains Roadless Values					0	5,200	5,200
Allows Development		0	0	5,600	5,600	400	400
Sum	5,600	5,600	5,600	5,600	5,600	5,600	5,600

North Wasatch-Ogden Valley Management Area

Upper South Fork

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water –5- Located about 10 miles east of Ogden above Causey Reservoir. The roadless area drains Causey Reservoir then into Pineview Reservoir which is used as a surface water supply for public drinking water.
- Properly Functioning Condition – 3 - The Upper South Fork roadless area has a variety of plant communities including aspen, Douglas-fir, spruce-fir, sagebrush, and tall shrub. Only the northernmost portion of this roadless area is in allotments. Dyers woad approaches the western portion of this area, while thistle (Canada and musk) have been found in or near the area
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 4 - Townsends big-eared bat present.
- Fish Species at Risk -5- This area has an isolated population of cutthroat trout Wheat Grass and Left Fork of the South Fork.
- ROS – 5- 3% SPM, 92% SPNM.
- Landscape Character and Scenic Integrity – 5 - Very intact natural appearing landscape with minimal intrusions. Scenic Attractiveness Level: Distinct. Rounded ridgetops, bisected with steep drainages bordered with sheer cliffs characterize the area. Many different types of vegetation are found within the area that add to the texture of the landscape.
- Heritage Resources – 2 to 3 - Low survey data, but low to moderate potential for sites based on professional judgment.
- Unique Characteristics – 1 - Portion of one stream found eligible in the wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 3 – (Acres and Size: 3. Medium. (17,255 acres). Adjacency: 2. Isolated near rural or within general national forest context. Context: Bear River Range (Monte Cristo Range). 2. Some other roadless or Wilderness in section. Integrity: Rank 4. Cherry Stems, 3. 1 or 2 and/or very short intrudes almost unnoticeably. (2 short .5 mile segments intrude. One just north of Causey Reservoir; the other at the north end of the area at the head of Wheatgrass Canyon.)

Summary Statement

- Mostly medium to high values: public drinking water, fish SAR, terrestrial SAR, and semi-primitive experience are high and scenic integrity is very high.

Effects on Individual Roadless Area

Upper South Fork – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	17,200	0	17,200	0	0	14,400	14,200
2.6	0	15,100	0	0	0	0	0
3.1	0	1,200	0	0	300	0	0
3.2	0	1,000	0	0	0	2,100	0
3.2U	0	0	0	0	0	0	2,300
4.1	0	0	0	14,300	15,500	0	0
4.2	0	0	0	1,600	0	0	0
4.3	0	0	0	0	500	0	0
4.4	0	0	0	0	1,000	700	700
6.1	0	0	0	1,300	0	0	0

Upper South Fork – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	600	0	0	0	0
Rural	0	0	0	0	0	0	0	0
RN	0	2,600	0	2,300	2,600	1,500	900	900
SPM	0	100	0	0	0	0	600	600
SPNM	17,200	14,600	17,200	14,400	14,600	15,800	15,800	15,800

Upper South Fork – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	1,100	16,700	2,600	2,300	2,300	2,800
Snowmobile Not Allowed	17,200	17,200	16,200	0	14,600	14,900	14,900	14,400

Upper South Fork – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	17,200	17,200	17,200			14,400	14,200
Mostly Maintains Roadless Values				15,900	15,500	2,100	2,300
Allows Development				1,300	1,800	700	700
Sum	17,200	17,200	17,200	17,200	17,200	17,200	17,200

Additional Comments on Effects for High Value Roadless Area

In Alternatives 1, 2, and 6 the intent of the Roadless Areas Conservation Rule is applied and neither timber harvest nor road construction is allowed.

In Alternatives 1 and 3 all of the Upper South Fork roadless area is recommended for Wilderness (MPC 1.5) maintaining roadless area values.

In Alternative 2 88% of the Upper South Fork roadless area is managed as MPC 2.6 to maintain roadless character. Stringers of MPC 3.1 manage 7% along the Left Fork South Fork and Wheat Grass Creek to protect Bonneville cutthroat trout habitat while maintaining roadless values. MPC 3.2 manages terrestrial wildlife habitat on 6% of the area's northwest side while also maintaining roadless values.

In Alternative 4 roadless area values are maintained while managing 83% of the area for backcountry non-motorized recreation (MPC 4.1) and 9% for denser-use dispersed non-motorized recreation (MPC 4.2). The remaining 8% of the area, about 1,300 acres of the area's northwest side is managed for non-forested vegetation ecosystems (MPC 6.1) which allows vegetation treatments and road construction; this is approximately the same area that is managed under a terrestrial wildlife prescription in Alternative 2.

In Alternative 5, 90% of the Upper South Fork roadless area is managed for backcountry non-motorized recreation, which maintains roadless values. The remaining 10% is managed as either backcountry (3%) or dispersed (7%) motorized recreation, which can allow the development of roads, a full range of vegetation treatments, and trail construction potentially affecting roadless values.

In Alternative 6, 84% of the Upper South Fork roadless area is recommended as Wilderness, which maintains roadless values. The remainder is divided between terrestrial habitat MPC 3.2 (12%) and a dispersed motorized recreation MPC 4.4 (4%) to buffer the recommended Wilderness along the heavily used Monte Cristo and Wasatch Ridge areas, but allowing some possible effects to roadless values.

Alternative 7 is much like Alternative 6, recommending just slightly less Wilderness (83%). A similar buffer along the north side of the recommended Wilderness of MPCs 3.2 and 4.4 is provided. Most of the difference between Alternatives 6 and 7 for Upper South Fork roadless area is due to mapping refinement rather than any difference between the intent of the two alternatives.

Willard

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 5 - This roadless area is dominated by a variety of plant communities including spruce-fir, Douglas-fir, Gambel oak, juniper, tall forb, and sagebrush. It has examples of the Tall Forb communities in excellent condition, which have more or less been depleted elsewhere through historic grazing in many places on the forest. The area is not in an allotment, but has seen impacts from off road vehicle use.

- Vegetation Species at Risk - 4 - Wasatch rockcress, Burkes draba, and Utah ivesia occur in this roadless area and Wasatch fitweed occurs near the trail to Ben Lomond.
- Terrestrial Species at Risk – 5 - Wintering bald eagles.
- Fish Species at Risk -1 - No cutthroat trout or potential
- ROS – 5 – 34% SPM, 58% SPNM.
- Landscape Character and Scenic Integrity – 3 – Large number of ghost roads are in this roadless area on its eastern side. Scenic Attractiveness Level: Distinct. This area has very rugged rock spires, and rock monoliths mostly on the western face.
- Heritage Resources – 4 - Low data, but based on proximity to Public Grove area, high potential of prehistoric sites.
- Unique Characteristics – 1 - Portion of one stream found eligible in the wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 3 - (Acres and Size: 4. Medium Large (20,011 acres) Adjacency: 2. Isolated near rural or within general national forest context. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 4 or 5 and/or long and moderately intrusive. (Scenic Backway (Route 084) to top of Willard Peak is over 4 miles long and enters intrusively into the north side of the area.)

Summary Statement

- Mostly medium to high values. High values for PFC, terrestrial SAR, scenic attractiveness and integrity, and semi-primitive experience. Medium-high for Vegetation SAR and heritage.

Effects on Individual Roadless Area

Willard – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	8,300	0	0	0	0	0	0
2.6	10,500	18,400	0	0	0	0	11,400
2.7	200	200	0	0	0	200	2,100
3.1	100	500	19,100	19,100	0	18,100	0
3.1W	0	0	0	0	0	0	4,800
4.4	0	0	0	0	19,100	800	800

Willard – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	1,100	0	0	0	0
RN	1,500	1,600	2,400	100	3,000	1,900	700	700
SPM	6,800	6,800	9,000	3,700	6,100	6,100	6,800	6,800
SPNM	10,800	10,700	7,700	14,200	10,000	11,100	11,600	11,600

Willard – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	1,200	1,200	16,700	3,800	1,200	1,200	1,200	19,100
Snowmobile Not Allowed	17,900	17,900	2,400	14,200	17,900	18,000	18,000	0

Willard – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	20,000	20,000	20,000			200	11,400
Mostly Maintains Roadless Values						19,000	6,900
Allows Development				20,000	20,000	800	800
Sum	20,000	20,000	20,000	20,000	20,000	20,000	19,100

Lewis Peak

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 -Located on steep terrain just east of Ogden with the southern part just north of Ogden River in Ogden Canyon water supply for City of Ogden. The east side of the roadless area drains into Pineview Reservoir which is used as a surface water supply for public drinking water.
- Properly Functioning Condition – 3 - Lewis Peak roadless area is dominated by Gambel oak with Douglas-fir on more north-facing slopes and at higher elevations. The area has not seen recent historic grazing and, because of the dense oakbrush, probably has not been heavily grazed in the past. Dyers woad is a common component of the lower elevations surrounding this roadless area.
- Vegetation Species at Risk - 2 - Broadleaf penstemon is present and habitat for Utah fleabane may occur. Habitat for Burkes draba is also present, but recent surveys have not found this plant in the area.
- Terrestrial Species at Risk – Score for Criteria – 2 - Peregrine falcon habitat present.
- Fish Species at Risk -1- No cutthroat trout or potential.
- ROS – 5 – 56% SPM, 24% SPNM.
- Landscape Character and Scenic Integrity – 4 - Steep on both sides with Ogden Canyon on the south and North Pass divide on with power lines on the north. Scenic Attractiveness Level: Distinct.
- Heritage Resources – 3 - Low survey data - rank based on professional judgment.
- Unique Characteristics – 1 - None identified.

- Size and Context - Overall Score for Size and Context – 2 - (Acres and Size: 2. Medium Small (12,092 acres). Adjacency: 1. Isolated near urban. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 1 or 2 and/or very short intrudes almost unnoticeably. (One .75 cherry stem up Coldwater Canyon from the west.)

Summary Statement

- Mostly low values except PFC and heritage that are medium value and public drinking water and semi-primitive experience that are high value.

Effects on Individual Roadless Area

Lewis Peak – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	12,100	0	0	0	0	0	0
2.6	0	12,100	0	0	0	0	0
3.1	0	0	12,100	12,100	0	11,900	0
3.1W	0	0	0	0	0	0	11,900
4.4	0	0	0	0	11,200	100	100
4.5	0	0	0	0	900	0	0

Lewis Peak – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	1,100	0	0	0	0
Rural	1000	1000	1000	200	1000	1000	0	0
RN	1,800	1,800	2,400	200	5,100	1,800	1,200	1,200
SPM	3,200	3,200	5,900	2,000	2,500	3,200	3,200	3,200
SPNM	6,100	6,100	2,800	8,600	3,400	6,100	7,700	7,700

Lewis Peak – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	10,700	2,400	900	0	0	12,100
Snowmobile Not Allowed	12,100	12,100	1,400	8,600	11,200	12,100	12,100	0

Lewis Peak – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	12,100	12,100	12,100				
Mostly Maintains Roadless Values						11,900	11,900
Allows Development		0	0	12,100	12,100	200	200
Sum	12,100	12,100	12,100	12,100	12,100	12,100	12,100

Burch Creek

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - This roadless area is dominated by Gambel oak and scattered sagebrush openings with some limber pine at upper elevations. The area has not been grazed and the oak is likely to be too dense to accommodate much historic grazing. Dyers woad is a common component on the lower, west-facing slopes.
- Vegetation Species at Risk - 3 - Burkes draba occurs in this roadless area, while Wasatch rockcress and Utah fleabane are known from habitats nearby.
- Terrestrial Species at Risk – 2 - Peregrine falcon habitat present.
- Fish Species at Risk -2- The area has the potential for a population of cutthroat trout in Burch Creek. A treatment would need to be conducted to remove the natural rainbow trout
- ROS – 5 – 0 % SPM, 89% SPNM.
- Landscape Character and Scenic Integrity – 4 - Some ghost roading on southwest edge with possible old mine. Also Beus Trail creates a dominant line across gambel oak patches in the trail location. Area appears natural in vegetation patterns. Scenic Attractiveness Level: Distinct, from mid-slope to the top of the ridge line. Steep slopes with a high amount of diversity in vegetation, and rock outcrops. Below this level the landscape is Common, like the other landscapes along the Wasatch Front.
- Heritage Resources – 2 - No survey data, rank based on professional judgment of liklihood of presence of cultural resources.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context - 2 - (Acres and Size: 1. Small (7,518 acres). Adjacency: 1. Isolated near urban. Context: Wasatch Range, 2. Some other roadless or Wilderness in section. Integrity: Cherry Stems. 5. None.)

Summary Statement

- Mostly low except for PFC and vegetation SAR that are medium and semi-primitive experience that is high.

Effects on Individual Roadless Area

Burch Creek – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	6,900	0	0	0	0	0	0
2.6	0	6,900	0	0	0	0	0
3.1	0	0	6,900	6,900	0	6,900	0

3.1W	0	0	0	0	0	0	6,900
4.2	0	0	0	0	6,900	0	0
4.5	0	0	0	0	0	0	0

Burch Creek – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
Rural	0	0	0	800	0	0	0	0
RN	0	1,500	1,500	0	1,500	1,500	800	800
SPNM	6,900	5,400	5,400	6,100	5,400	5,400	6,200	6,200

Burch Creek – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	0	800	0	0	0	0
Snowmobile Not Allowed	6,900	6,900	6,900	6,100	6,900	6,900	6,900	6,900

Burch Creek – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	6,900	6,900	6,900				
Mostly Maintains Roadless Values					6,900	6,900	6,900
Allows Development				6,900			
Sum	6,900	6,900	6,900	6,900	6,900	6,900	6,900

Francis

Francis (Includes the North, Middle, and South Francis Roadless areas from the DEIS, now combined. Rational for separation into separate units was considered weak. Rather, combination of North and Middle units which have similar lands and are connected and linked by private land of similar character, and combination of Middle and South units which had been deemed separate based on minor unobtrusive powerline with no access roads is considered appropriate.)

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water - 5 - Located adjacent to Wasatch Front. Two of the drainages are used as a surface water supply for public drinking water.
- Properly Functioning Condition – 2 - The Francis roadless area is dominated by Gambel oak with sagebrush communities at highest elevations and Douglas-fir on north-facing slopes. The northeastern portion of the area is in a sheep allotment,

but does not show signs of excessive grazing. The lower, western slopes have a conspicuous component of dyers woad.

- Vegetation Species at Risk - 2 - Broadleaf penstemon and Utah fleabane occur in this roadless area.
- Terrestrial Species at Risk – 2 - Goshawk habitat present.
- Fish Species at Risk – 1 - No known cutthroat trout
- ROS – 5 – 10% SPM, 78% SPNM.
- Landscape Character and Scenic Integrity – 4 - Ghost roads on the western edge. Scenic Attractiveness Level: Common for the Wastach Front. Main vegetation is gambel oak except in drainage where there are cottonwoods and some conifer at higher elevations.
- Heritage Resources – 2 to 3 - No survey data, rank based on professional judgment.
- Unique Characteristics – 1 - Segment of the Great Western Trail present.
- Size and Context - - Overall Score for Size and Context – 2 – (Acres and Size: 3. Medium (15,196 acres.) Adjacency: 1. Isolated near urban, and 2. Isolated near rural or within general national forest context. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. None. (Combined area is larger than original three smaller areas. Area in close proximity to urban/ watersheds has relative high value.)

Summary Statement

- All low to medium values except scenic integrity that is medium-high and public drinking water and semi-primitive experience that are high.

Effects on Individual Roadless Area

Francis – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	8,100	0	0	0	0	0	0
2.6	6,200	14,300	0	0	0	0	4,800
3.1	0	0	12,100	12,100	12,100	12,100	0
3.1W	0	0	0	0	0	0	7,400
4.4	400	400	400	400	400	400	400
4.5							
6.1	0	0	0	0	0	2,200	2,200
6.2	0	0	2,200	2,200	2,200	0	0

Francis – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	200	0	0	0	0
RN	3,200	3,200	3,200	900	3,200	3,200	1,700	1,700
SPM	0	0	0	0	0	0	1,500	1,500
SPMN	11,600	11,600	11,600	13,700	11,600	11,600	11,600	11,600

Francis – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	100	100	1,500	900	1,500	1,500	0	0
Snowmobile Not Allowed	14,700	14,500	13,300	13,700	13,300	13,300	14,800	14,800
Heliski – yes	0	0	5,400	5,400	5,400	5,400	5,400	5,400
Heliski - no	0	0	9,400	9,400	9,400	9,400	9,400	9,400

Francis – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	14,800	14,300	12,100				4,800
Mostly Maintains Roadless Values						14,300	7,400
Allows Development		400	2,600	14,800	14,800	400	2,600
Sum	14,800	14,800	14,800	14,800	14,800	14,800	14,800

Farmington

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 4 - The Farmington Roadless Area includes all of the existing Morris Creek Research Natural Area (RNA), which has represenative stands of Douglas-fir and aspen communities. It also includes all of the proposed expansion of this RNA which includes relatively undisturbed stands of curlleaf mountain mahogany, Gambel oak, aspen, Douglas-fir, and subalpine fir communities. Dyers woad is a common component of the lower elevations on the north and western boundaries of this roadless area.
- Vegetation Species at Risk - 3 - This roadless area has at least one population of broadleaf penstemon as well as Wasatch rockcress.
- Terrestrial Species at Risk – 2 - Goshawk habitat present.
- Fish Species at Risk – 3- The area contains habitat sufficient to maintain a cutthroat trout population. Historically cutthroat trout were found in Parrish Creek. These fish were lost in 1983 during the floods. Cutthroat trout could be sustained in Farmington Creek. Treatment of non-native fish would be required here

- ROS – 3 – 7% SPM, 64% SPNM.
- Landscape Character and Scenic Integrity – 4 - Ghost roads on the western edge. Scenic Attractiveness Level: Common for the Wastach Front. Main vegetation is gambel oak except in drainages where there are cottonwoods and some conifer at higher elevations.
- Heritage Resources – 3 - No survey data, rank based on professional judgment of likelihood of presence of cultural resources.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 3 - (Acres and Size: 2. Medium Small (10,946 acres). Adjacency: 1. Isolated near urban. Context: Wasatch Range. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5 None. (Area is pretty much the relative steep west facing slope and canyons of the Wasatch Range from Farmington to Bountiful.)

Summary Statement

- All values are low to medium, except PFC and scenery that are somewhat higher.

Effects on Individual Roadless Area

Farmington – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.4	1,200	1,200	200	200	200	1,200	1,200
2.6	8,700	8,700	0	0	0	0	0
3.1	0	0	9,600	9,600	9,600	8,700	0
3.1W	0	0	0	0	0	0	8,700
4.4	1000	1000	1,100	1,100	1,100	1000	1000

Farmington – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	300	0	0	0	0
RN	4,500	4,700	4,700	2,000	4,700	4,700	3,200	3,200
SPM	0	0	0	0	0	0	800	800
SPNM	6,500	6,200	6,200	8,600	6,200	6,200	7,000	7,000

Farmington – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	3,600	2,000	3,400	3,200	1,300	1,300
Snowmobile Not Allowed	10,900	10,900	7,400	8,600	7,600	7,700	9,600	9,600
Heliski – yes	0	0	700	700	700	700	700	700
Heliski - no	10,900	10,900	10,200	10,200	10,200	10,200	10,200	10,200

Farmington – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	10,900	9,900	9,800		200	1,200	1,200
Mostly Maintains Roadless Values				200		8,700	8,700
Allows Development		1000	1,100	10,700	10,700	1000	1000
Sum	10,900	10,900	10,900	10,900	10,900	10,900	10,900

Hogsback

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 3 - This roadless area is dominated by aspen, sagebrush and Gambel oak with some isolated limber pine at the higher elevations on the western boundary. Two sheep allotments occur within this roadless area boundary, although evidence of grazing is not severe.
- Vegetation Species at Risk - 3 - Broadleaf penstemon occurs in this roadless area.
- Terrestrial Species at Risk – 2 - Goshawk and flammulated owl habitat present.
- Fish Species at Risk – 5 - This area has the potential for isolated population of cutthroat trout in the tributaries to Hardscrabble Creek
- ROS – 3 – 0 % SPM, 65% SPNM.
- Landscape Character and Scenic Integrity – 4 - Some ghost roads in the area. Scenic Attractiveness Level: Common for the Wasatch Front. Main vegetation is gambel oak except in drainages where there are cottonwoods and aspen/conifer at higher elevations.
- Heritage Resources – 2 - No survey data, rank based on professional judgment and likelihood of presence of cultural resources.
- Unique Characteristics –1 - None identified.
- Size and Context - Overall Score for Size and Context – 1 – (Acres and Size: 1. Small (7931 acres). Adjacency: 1. Isolated near rural or within general national forest context. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. 5 and/or long and moderately intrusive. (Moderate intrusion into the area from the northwest in the Farmington Flats area. Constricts area to narrow corridor.)

Summary Statement

- Mostly low except PFC, vegetation SAR, semi-primitive experience, and scenic integrity that are medium, and fish SAR that is high.

Effects on Individual Roadless Area

Hogsback – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	6,900	6,900	0	0	0	0	0
4.4	1,000	1,000	1,000	400	1,000	1,000	1,000
5.2	0	0	0	0	0	0	3,500
6.1	0	0	0	0	0	6,900	3,400
6.2	0	0	6,900	7,500	6,900	0	0

Hogsback – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	900	0	0	0	0
RN	2,700	2,700	2,700	1,300	2,700	2,700	2,700	2,700
SPNM	5,200	5,200	5,200	5,700	5,200	5,200	5,200	5,200

Hogsback – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	2,700	1,300	2,700	2,700	2,700	2,700
Snowmobile Not Allowed	7,900	7,900	5,200	5,700	5,200	5,200	5,200	5,200
Heliski – yes	0	0	1000	1000	1000	1000	1000	1000
Heliski - no	7,900	7,900	6,900	6,900	6,900	6,900	6,900	6,900

Hogsback – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	7,900	6,900					
Mostly Maintains Roadless Values						6,900	
Allows Development		1,000	7,900	7,900	7,900	1,000	7,900
Sum	7,900	7,900	7,900	7,900	7,900	7,900	7,900

Mueller Park

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - A surface water source is located at Mueller Park about 2 miles west of the roadless area. Located about 4 miles directly east of Bountiful, access to this area is about 9 miles from Bountiful when driving up the Ward Canyon Road to this area.
- Properly Functioning Condition – 3 - This roadless area includes relatively undisturbed Gambel oak, sagebrush, Douglas-fir, and spruce-fir plant communities. Noxious weeds are not conspicuous in this roadless area.
- Vegetation Species at Risk - 2 - No known SAR plants occur within this roadless area, although habitat for the nearby occurring Utah fleabane is present.
- Terrestrial Species at Risk – 2 - Goshawk, Northern three-toed woodpecker, and flammulated owl habitat present.
- Fish Species at Risk –3 - This area has no cutthroat trout but has the potential habitat.
- ROS – 3 – 0 % SPM, 67% SPNM.
- Landscape Character and Scenic Integrity – 4 - Some ghost roads in the area. Scenic Attractiveness Level: Common for the Wasatch Front; main vegetation is gambel oak except in drainages where there are cottonwoods and aspen/conifer at higher elevations.
- Heritage Resources – 3 - Low data, but moderate potential for cultural resources.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context Criteria – 1 (Acres and Size: 1. Small (7,752 acres). Adjacency: 1. Isolated near urban. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems 3. 3 or 4 and/or short and short intrusions. (Four short cherry stems, the longest of which is just less than 1 mile along Forest Road 805 near the Davis/Morgan County line. Area is

Summary Statement

- Some low values with some medium values for PFC, fish SAR, semi-primitive experience and heritage. Public drinking water and scenic integrity are high.

Effects on Individual Roadless Area

Mueller Park – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.6	5,300	3,800	0	0	0	0	0
3.1	0	1,500	1,500	3,200	1,500	1,500	0
3.1W	0	0	0	0	0	0	1,500
4.1	1,700	0	0	0	0	0	0
4.2	500	500	500	0	500	500	500
4.4	200	1,800	1,800	500	1,800	1,800	1,800

6.1	0	0	0	0	0	3,800	3,800
6.2	0	0	3,800	4,000	3,800	0	0

Mueller – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	700	0	0	0	0
RN	2,400	2,400	4,200	0	2,400	2,400	2,400	2,400
SPM	0	0	0	900	0	0	0	0
SPNM	5,200	5,200	3,500	6,000	5,200	5,200	5,200	5,200

Mueller Park – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	400	400	2,700	900	2,700	400	400	400
Snowmobile Not Allowed	7,300	7,300	4,900	6,000	4,900	7,300	7,300	7,300
Heliski – yes	0	0	3,200	3,200	3,200	3,200	3,200	3,200
Heliski - no	0	0	4,400	4,400	4,400	4,400	4,400	4,400

Mueller Park – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	7,700	5,300	1,500				
Mostly Maintains Roadless Values		500	500		500	5,800	2,000
Allows Development		1,800	5,600	7,700	7,100	1,800	5,600
Sum	7,700	7,700	7,700	7,700	7,700	7,700	7,700

Central Wasatch Management Area

Red Butte

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 5 - Includes all of the existing Red Butte Research Natural Area (RNA), which is dominated by Gambel oak, with inclusions of Douglas-fir, aspen, and sagebrush communities in relatively undisturbed condition. The lower portion of this RNA is being proposed as a special interest area because of the widespread dominance of non-native plant species such as cheatgrass and dalmation toadflax (a Utah noxious weed).
- Vegetation Species at Risk - 5 - This roadless area has populations of several plant species at risk (SAR) including Wasatch rockcress, Arabis glabra var. furcatipilis, Utah fleabane, and broadleaf penstemon. In addition, it has the only known population of small yellow lady's slipper known to occur in an uncultivated population within the state of Utah. Beckwith violet, a disjunct species (one more common elsewhere, but uncommon in Utah) likely occurs within this roadless area.
- Terrestrial Species at Risk – 3 - Yellow-billed cuckoo, goshawk, peregrine falcon habitat present.
- Fish Species at Risk – 5 - This area contains cutthroat trout and June sucker.
- ROS – 5* – In mapping according to ROS conventions, Red Butte comes out as 100% SPM or SPNM. *In reality, under current management as a Research Natural Area management the area is closed to all recreation use.
- Landscape Character and Scenic Integrity – 3 - There is a spider web of trails or ghost roads in the southwest corner of this area. The dam face is not vegetated. Scenic Attractiveness Level: Distinct.
- Heritage Resources – 3 to 4 - Low data, but potential to discover early Mormon history, lime kilns, etc.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 3 – (Acres and Size: 1. Small (6159 acres.) Adjacency: 1. Isolated near urban. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 4. and 5. Two roads present, but none open in practice. Area has been closed to public access as RNA for years.)

Summary Statement

- Mostly medium and some high. High values for Vegetation SAR, PFC, fish SAR and semi-primitive experience.

Effects on Individual Roadless Area

Red Butte – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
2.4	3,200	3,200	3,200	4,700	3,900	3,200	3,200
2.6	1,400	0	0	0	0	0	0
2.7	800	800	800	0	900	800	800
3.1	800	2,200	2,200	1,400	1,400	2,200	0
3.1A	0	0	0	0	0	0	800
3.1W	0	0	0	0	0	0	1,400

Red Butte – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	0	0	100	1,700	0	0	0	0
SPNM	6,200	6,200	6,100	4,400	6,200	6,200	6,200	6,200

Red Butte – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	200	1,700	1,100	0	0	0
Snowmobile Not Allowed	6,200	6,200	6,000	4,400	5,100	6,200	6,200	6,200

Red Butte – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	6,200	6,200	5,300		3,900	4,000	3,200
Mostly Maintains Roadless Values			800	4,700	900	2,200	3,000
Allows Development				1,400	1,400		
Sum	6,200	6,200	6,200	6,200	6,200	6,200	6,200

Mount Aire

Inventory of Values

- Soil and Water – 1 - Few small wetlands occur along small narrow streams.
- Sources of Public Drinking Water – 5- Located adjacent to Salt Lake City in Parleys and Mill Creek Canyons. The northern portion of the flows into Parleys Creek that is a surface water public drinking source for Salt Lake City.
- Properly Functioning Condition – 3 - The Mount Aire roadless area is dominated by Gambel oak with Douglas-fir at mid elevations, often on cooler, protected sites, spruce-fir stands at higher elevations and aspen stands (many being replaced by conifer) scattered at mid and upper elevations. Some noxious weeds are

present, but are not a conspicuous aspect in this roadless area, except along some trails. Dyers woad is likely to increase here unless actions are taken to keep it out of the area.

- Vegetation Species at Risk - 2 - Utah fleabane is present in this roadless area, and habitat is present for nearby occurring Broadleaf penstemon.
- Terrestrial Species at Risk – 2 - Peregrine falcon habitat present.
- Fish Species at Risk –5 - The area has the potential for a population of cutthroat trout in Mill Creek. Cutthroat trout are found in Lamb's Creek.
- ROS – 5 – 0% SPM, 85% SPNM.
- Landscape Character and Scenic Integrity – 4 - Pipeline trail bisects this area which otherwise has a high integrity level. Scenic Attractiveness level: Common, with rugged slopes and somewhat common rock outcrops and vegetation of gamble oak and maple.
- Heritage Resources – 3 - No data, but moderate potential for mining sites.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 3 - (Acres and Size: 1. Small (9701 acres). Adjacency: 1. Isolated near urban, and 2. Isolated near rural or within general national forest context, and 3. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Wasatch Range, Uinta Mountains. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. None. (Area is erratically shaped based on close to urban landownership patterns. While small, it has higher value than some more remote areas of the same size.)

Summary Statement

- All low to medium values except public drinking water, fish SAR and semi-primitive experience that are high.

Effects on Individual Roadless Area

Mount Aire – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	9,400	0	0	0	0	0	0
2.7	0	5,700	0	0	0	0	0
3.1	0	3,800	3,800	4,800	3,800	3,800	0
3.1W	0	0	0	0	0	0	9,600
4.1	0	0	5,700	4,700	5,700	0	0
4.2	200	0	0	0	0	5,700	0
4.5	100	100	100	100	100	100	100

Mount Aire – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	100	0	0	0	0
Rural	200	0	0	0	0	0	0	0
RN	0	1,400	1,400	1,600	1,400	1,400	1,400	1,400
SPNM	9,500	8,300	8,300	8,000	8,300	8,300	8,300	8,300

Mount Aire – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	100	1,600	1,200	0	0	0
Snowmobile Not Allowed	9,700	9,700	9,600	8,000	8,500	9,700	9,700	9,700
Heliski – yes	0	0	800	800	800	800	800	800
Heliski - no	9,700	9,700	8,900	8,900	8,900	8,900	8,900	8,900

Mount Aire – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	9,700	9,600	3,800				
Mostly Maintains Roadless Values			5,700	4,700	5,700	9,600	9,600
Allows Development		100	100	5,000	4,000	100	100
Sum	9,700	9,700	9,700	9,700	9,700	9,700	9,700

Mount Olympus

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - Located adjacent to Salt Lake City. The southern part of the roadless area in the upper part of Big Cottonwood Canyon drains into Big Cottonwood Creek that is a surface water public drinking source for Salt Lake City.
- Properly Functioning Condition – 4 - Aspen is a dominant component of the Mount Olympus roadless area. Gambel oak stands occur on lower sites in Mill Creek Canyon and on south-facing mid elevations in Big Cottonwood Canyon. Spruce-fir stands occur at the high elevations. This area has not been grazed for a very long time and ecological conditions are generally very good. Understory plant dominance in the aspen stands is an example of some of the best conditions in these stands in northern Utah. Noxious weeds are not conspicuous in this roadless area, although jointed goatgrass has been seen near the road in the lower portion of Big Cottonwood Canyon.
- Vegetation Species at Risk - 5 - Wasatch jamesia, Utah fleabane, broadleaf penstemon, and Utah shooting star are present in this roadless area, while habitat is present for the nearby occurring Wasatch draba. Because of the rarity of Utah

shooting star and the potential threats to this species, this roadless area is ranked the highest.

- Terrestrial Species at Risk – 2 - Peregrine falcon habitat present.
- Fish Species at Risk – 2 - The area has the potential for a population of cutthroat trout in Mill Creek. A treatment would need to be conducted to remove the natural rainbow trout
- ROS – 5 – 0% SPM, 77% SPNM.
- Landscape Character and Scenic Integrity – 4 – A few ghost roads from past mining activity are visible, but area appears very natural. Scenic Attractiveness Level: Distinct. Steep rugged mountains with pockets of conifer at higher elevation and oak brush at lower elevations.
- Heritage Resources – 3 - Low data, but moderate potential for mining sites.
- Unique Characteristics – 3 - Excellent examples of glaciation present.deep limestone cave present.
- Size and Context - Overall Score for Size and Context – 3 – (Acres and Size: 2. Medium Small (10,139 acres + adjacent Mt. Olympus Wilderness 15,300 acres) = total over 25,000 acres for both areas.) Adjacency: 1.Isolated near urban, and 2. Isolated near rural or within general national forest context. Context: Wasatch Range. 1. Much other roadless or Wilderness in section.Integrity: Cherry Stems, 5. None. (While no cherry stems, area is composed of lots of small slivers around the west north and south sides of the Wilderness, and a large contiguous mass of lands to the east. Larger masses of undeveloped lands of this size have great value locally to relieve pressure of potential growth.)

Summary Statement

- Mostly medium values. High values for public drinking water, semi-primitive experience, vegetation SAR, and scenic attractiveness.

Effects on Individual Roadless Area

Mount Olympus – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	9,300	2,200	2,000	0	0	0	0
2.6	0	0	0	0	0	2,000	2,000
2.7	0	7,300	0	0	0	0	0
3.1	100	100	100	100	100	300	0
3.1W	0	0	0	0	0	0	7,700
3.2	0	0	0	0	0	0	0
3.2U	0	0	0	0	0	0	0
4.1	200	0	7,400	9,400	9,000	0	0
4.2	0	0	100	100	100	7,400	0
4.5	500	500	500	500	900	300	300

Mount Olympus – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	200	0	0	0	0
Rural	400	0	0	0	400	0	0	0
RN	0	1,900	2,000	1,000	2,000	2,100	2,100	2,100
SPM	0	0	0	400	0	0	0	0
SPNM	9600	8100	8000	8400	7600	7800	7800	7800

Mount Olympus– Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	200	1,400	100	0	0	0
Snowmobile Not Allowed	10,000	10,000	9,700	8,400	9,800	10,000	10,000	9,900
Heliski – yes	0	0	5,400	4,200	4,200	4,200	4,200	4,200
Heliski - no	10,100	10,100	4,700	5,900	5,900	5,900	5,900	5,900

Mount Olympus – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	10,100	9,600	2,100			2,000	2,000
Mostly Maintains Roadless Values			7,400	9,500	9,100	7,700	7,700
Allows Development		500	500	600	1000	300	300
Sum	10,100	10,100	10,100	10,100	10,100	10,100	10,100

Twin Peaks

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - Located adjacent to Salt Lake City and drains into Big and Little Cottonwood Creeks that are surface water public drinking sources for Salt Lake City.
- Properly Functioning Condition – 4 - This roadless area likely contains stands of the Limber Pine/Oregon Grape habitat type and the Ross Avens cover type identified by The Nature Conservancy as RNA needs on National Forest Lands in Utah (Tuhy 1998).
- Vegetation Species at Risk - 3 - Wasatch jamesia, Garrett fleabane, Garrett bladderpod, and broadleaf penstemon occur within this roadless area. In addition, habitat is present for the nearby occurring Lepidium montanum var. alpinum.
- Terrestrial Species at Risk – 2- Peregrine falcon habitat present.

- Fish Species at Risk – 5 - There is a small population of cutthroat trout in Death Smith Canyon.
- ROS – 1 – 0 % SPM, 48% SPNM.
- Landscape Character and Scenic Integrity – 3 - There was a lot of mining activity in this area. There are remnants of tailings piles and disturbed areas. There are a number of ghost roads and maintenance roads for the mines still on the mountain. Scenic Attractiveness Level: Distinct, because of the steep jagged cliffs and glaciation on many of the slopes.
- Heritage Resources – 4 to 5 - Low data, but high potential for mining sites.
- Unique Characteristics – Renowned examples of glaciation, portion of one river found eligible in wild and scenic river inventory; medium value.
- Size and Context - Overall Score for Size and Context Criteria – 3- Acres and Size: 1, 2, and 3. Small to medium (6,490 acres + 11,495 Twin Peaks Wilderness. The cumulative total of the Wilderness and this roadless area makes for a medium sized area for the Forest.)Adjacency: 1. Isolated near urban, and 2. Isolated near rural or within general national forest context. Context: Wasatch Range, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. None. (Area is erratically shaped due to Wilderness and other developed uses and landownership in the area. Size of undeveloped area is considered of some value to relieve pressure of potential growth on undeveloped area.)

Summary Statement

- Some low, but mostly medium values. High values for public drinking water, Fish SAR, and heritage.

Effects on Individual Roadless Area

Twin Peaks – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	5,700	2,300	500	0	0	0	0
2.6	0	0	0	0	0	0	1,600
2.7	0	2,600	0	0	0	0	0
3.1	300	800	300	800	800	1,000	0
3.1W	0	0	0	0	0	0	4,600
4.1	0	0	3,600	3,500	3,200	3,600	0
4.2	0	300	0	0	0	0	0
4.3	0	0	1,700	1,700	1,700	1,700	0
4.5	200	200	200	300	500	0	0

Twin Peaks – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	900	0	0	0	0
Rural	300	300	500	0	700	500	0	0
RN	0	2,000	1,900	900	2,800	3,100	3,600	3,600
SPM	0	0	800	1,400	0	0	0	0
SPNM	5,900	3,900	3,100	3,000	2,500	2,600	2,600	2,600

Twin Peaks – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	500	2,300	800	0	0	0
Snowmobile Not Allowed	6,100	6,100	5,600	3,000	5,300	6,200	6,200	6,200
Heliski – yes	0	0	3,400	3,400	3,400	3,400	3,400	3,400
Heliski - no	6,200	6,200	2,800	2,800	2,800	2,800	2,800	2,800

Twin Peaks – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	6,200	5,700	800				1,600
Mostly Maintains Roadless Values		300	3,600	3,500	3,200	6,200	4,600
Allows Development		200	1,900	2,700	3,000		
Sum	6,200	6,200	6,200	6,200	6,200	6,200	6,200

White Pine

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - Located about 6 miles east of Salt Lake City in Little Cottonwood Canyon and flows into Little Cottonwood Creek that is a surface water public drinking source for Salt Lake City.
- Properly Functioning Condition – 4 - This roadless area includes alpine and subalpine plant communities and likely contains stands of the Limber Pine/Oregon Grape habitat type and the Ross Avens cover type identified by The Nature Conservancy as RNA needs on National Forest Lands in Utah (Tuhy 1998). Aspen and spruce -fir communities also occur. No noxious weeds have been noted and the area has not been grazed.
- Vegetation Species at Risk - 3 - Wasatch fitweed, Garrett's fleabane, and broadleaf penstemon occur in this roadless area, while habitat for Garrett's bladderpod is present.
- Terrestrial Species at Risk – 2 - Goshawk and peregrine falcon habitat present.
- Fish Species at Risk – 2 - Habitat is available in White Pine Creek. The stream would have to be treated to remove existing trout.
- ROS – 5 – 0 % SPM, 81% SPNM.

- Landscape Character and Scenic Integrity – 5 – Area generally appears natural. Scenic Attractiveness Level: Distinct, steep rugged peaks and glaciation topography. Alpine fir in pockets and lakes in depressions.
- Heritage Resources – 3 to 4 - Low data, but moderate potential for mining sites.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 3 – (Acres and Size: 1. Small (2059 acres + adjacent to Lone Peak Wilderness 9747 acres on WCNF, to total 31,165 total acres for the Wilderness, including 20,829 on the Uinta NF.) Adjacency: 1. Isolated near urban, and 2. Isolated near rural or within general national forest context. Context: Wasatch Range 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5 None. (Area lies between Snowbird and Lone Peak Wilderness. As a roadless area it is small in its own right, but has relatively high value for an area this size due to its location.)

Summary Statement

- Mostly medium to low values except for public drinking water, semi-primitive experience, and scenic attractiveness.

Effects on Individual Roadless Area

White Pine – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	1,900	1,900	0	0	0	0	0
2.6	0	0	0	0	0	0	1,900
4.1	0	0	1,900	1,900	0	1,900	0
4.5	0	0	0	0	1,900	0	0

White Pine – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
Rural	0	0	1,900	200	1,900	300	0	0
RN	0	0	0	100	0	0	300	300
SPNM	1,900	1,900	0	1,600	0	1,700	1,700	1,700

White Pine – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	0	300	1,800	0	0	0
Snowmobile Not Allowed	1,900	1,900	1,900	1,600	100	1,900	1,900	1,900
Heliski – yes	0	0	1,800	1,800	1,800	1,800	1,800	1,800
Heliski – no	1,900	1,900	100	100	100	100	100	100

White Pine – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	1,900	1,900					1,900
Mostly Maintains Roadless Values			1,900	1,900		1,900	
Allows Development					1,900		
Sum	1,900	1,900	1,900	1,900	1,900	1,900	1,900

Lone Peak

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 4 - This roadless area likely contains the Aspen/Bracken Fern community type identified by The Nature Conservancy as an RNA need on National Forest Lands in Utah (Tuhy 1998). While dyers woad is not a conspicuous component, it is prime habitat for the expansion of this noxious weed, especially on the western unit.
- Vegetation Species at Risk - 3 - No known SAR plants occur within this roadless area, although habitats for the nearby occurring Wasatch jamesia, Wasatch rockcress, and Utah fleabane are present and these species are likely to occur.
- Terrestrial Species at Risk – 2 - Peregrine falcon habitat present.
- Fish Species at Risk –5 - There is a small population of cutthroat trout in Little Cottonwood Creek.
- ROS – 3 – 0 % SPM, 57% SPNM.
- Landscape Character and Scenic Integrity – 4 - The area is adjacent to Little Cottonwood road and it has had a lot of activity in the past. From an aerial section view the landscape appears intact, but there are numerous cultural features that can be found in of the foreground landscape when you are on the ground. Scenic Attractiveness Level: Distinct.
- Heritage Resources – 4 - Low data, but moderate to high potential for mining and Native American sites.
- Unique Characteristics – 1 - Portion of one river found eligible in wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 1 - (Acres and Size: 1. Small (874 acres of roadless + adjacent to Lone Peak Wilderness 9747 acres on WCNF, to total 31,165 total acres for the Wilderness, including 20,829 on the Uinta NF.) Adjacency: 1. Isolated near urban. Context: Rank 3. Wasatch Range.1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. None. (Area consists of several blocks and slivers of roadless lands adjacent to Lone

Peak Wilderness. Size of acreage and relative increase to existing roadless from protection is small.)

Summary Statement

- Mostly medium values, some low values. High value for fish SAR.

Effects on Individual Roadless Area

Lone Peak – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	900	500	0	0	0	0	0
3.1	0	400	400	900	400	400	0
3.1W	0	0	0	0	0	0	400
3.2	0	0	500	0	500	500	0
3.2U	0	0	0	0	0	0	500

Lone Peak – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
NA	0	0	0	500	0	0	0	0
Rural	0	400	400	0	400	400	0	0
RN	0	0	0	100	0	0	400	400
SPNM	900	500	500	400	500	500	500	500

Lone Peak – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	0	0	100	0	0	0	0
Snowmobile Not Allowed	900	900	900	400	900	900	900	900
Heliski – yes	0	0	0	0	0	0	0	0
Heliski - no	900	900	900	900	900	900	900	900

Lone Peak – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	900	900	900				
Mostly Maintains Roadless Values						900	900
Allows Development				900	900		
Sum	900	900	900	900	900	900	900

Stansbury Management Area

Stansbury Mountains

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 1- No surface sources of public drinking water are downstream of roadless area.
- Properly Functioning Condition – 4 - This roadless area includes some stands of Douglas-fir and Aspen with minor inclusions of white fir identified by The Nature Conservancy as RNA needs on National Forest Lands in Utah (Tuhy 1998). Allotments cover almost all of the roadless area. White top occurs in the lower portions of North Willow and South Willow canyons, typically outside the roadless areas.
- Vegetation Species at Risk - 2 - Broadleaf penstemon occurs in this roadless area.
- Terrestrial Species at Risk – 4 - Peregrine falcon and goshawk present.
- Fish Species at Risk – 2 - The area has the potential for a population of cutthroat trout in North and South Willow Creeks. A treatment would need to be conducted to remove the natural rainbow and brown trout.
- ROS – 5 – 52% SPM, 43 % SPNM.
- Landscape Character and Scenic Integrity – 3 - FS and BL M travel routes inside the area. Chaining areas inside the area on eastern edge. Watershed treatment terracing is present. Scenic Attractiveness Levels: Distinct in main drainages with rock spires. Common on much of the front face in the upper elevations; in lower elevations the area is Indistinct.
- Heritage Resources – 5 - High number of prehistoric sites located in a small survey area and high potential for new discoveries.
- Unique Characteristics – 1 - Portion of the area is part of wild horse territory.
- Size and Context - Overall Score for Size and Context – 4 - (Acres and Size: 5. Large (39,680 acres WCNF roadless + 25,215 Deseret Peak Wilderness + adjacent roadless on BLM to the north – over 75,000 acres total.) Adjacency: 2. Isolated near rural or within general national forest context. Context:Stansbury Range. 2. Some other roadless or Wilderness in section. Integrity: Cherry Stems, 1. More than 5 and/or very long and intrudes deeply. These segmentations and intrusions do detract from the undisturbed nature of the area.) (The Stansbury Roadless Area has about 10 cherry stems. The most intrusive are up South Willow, North Willow, Davenport Canyons on the east slope. Other more minor intrusions come up Bear Fork on the east slope north of East Hickman Canyon, and up Deadman Canyon in the southwest corner. This roadless area has relatively high value on the Forest as it is large and in different geographic area.)

Summary Statement

- Mostly medium to higher values. High values for heritage, semi-primitive experience and size and context.

Effects on Individual Roadless Area

Stansbury Mountains – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	37,300	17,100	5,000	0	0	0	0
2.6	0	16,800	12,100	0	0	17,100	17,100
3.1	0	300	0	0	0	300	0
3.1A	0	0	0	0	0	0	300
3.2	0	100	100	100	100	100	0
3.2U	0	0	0	0	0	0	100
4.3	0	0	0	0	0	1,100	1,100
4.4	500	3,500	3,800	3,800	3,800	3,300	3,300
4.5	0	0	0	0	0	300	300
6.1	1,900	1,900	0	0	0	17,500	17,500
6.2	0	0	18,700	35,800	35,800	0	0

Stansbury Mountains – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	500	3,000	3,100	6,000	4,600	3,000	1,800	1,800
SPM	0	17,500	20,100	29,900	22,700	19,200	20,700	20,700
SPNM	39,200	19,200	16,500	3,800	12,500	17,500	17,200	17,200

Stansbury Mountains – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	500	2,400	2,500	35,800	4,100	3,400	800	800
Snowmobile Not Allowed	39,200	37,300	37,200	3,800	35,500	36,300	38,800	38,800

Stansbury Mountains – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	39,700	36,200	17,200			17,100	17,100
Mostly Maintains Roadless Values						19,100	400
Allows Development		3,500	22,400	39,700	39,700	3,500	22,200
Sum	39,700	39,700	39,800	39,700	39,700	39,700	39,700

Additional Comments on Effects for High Value Roadless Area

In Alternatives 1, 2, and 6 the intent of the Roadless Areas Conservation Rule is applied and neither timber harvest nor road construction is allowed.
Alternative 1 recommends 94% of the Stansbury Mountains roadless area as Wilderness. The 500 of the remaining acres are in MPC 4.4, dispersed motorized, and 1,900 acres in MPC 6.1 maintaining and restoring non-forested vegetation ecosystems in the northwest corner of the area. All of these prescriptions maintain roadless values in this alternative.

In Alternative 2 substantial recommendations for Wilderness in the Stansbury Mountains roadless area both north and south of the existing Deseret Peak Wilderness total 43% of the area. Additionally, MPC 2.6 is applied to 42% of the area along its east side, and 6% is in MPC 6.1 for non forested-vegetation restoration, so that a total of 91% of the area's roadless values are maintained. The remaining 9% of the Stansbury Mountains roadless area is MPC 4.4 for dispersed motorized recreation that allows development.

In Alternative 3 Wilderness is recommended for 13% of the Stansbury Mountain roadless area, an area south of Deseret Peak. 30% of the roadless area is managed as MPC 2.6, which also maintains roadless values. 56% of the roadless area allows development; most of this is in MPC 6.2 forage production for livestock (47% of the roadless area), while 9% of the roadless area is in MPC 4.4 for dispersed motorized recreation. A 100-acre block of MPC 3.2 is provided on the west slope of the area.

In Alternative 4 and 5 no Wilderness or roadless value maintenance is provided for the Stansbury Mountains roadless area. MPC 6.2 is applied to 91% of the roadless area, for providing vegetation as livestock forage. The remaining 9% of the roadless areas is allocated to MPC 4.4 for dispersed motorized recreation. A 100-acre block of MPC 3.2 is provided on the west slope of the area.

In Alternative 6, no Wilderness is recommended for the Stansbury Mountain Roadless area. However, MPC 2.6 is applied to two large blocks adjacent to the south and north ends of Deseret Peak Wilderness that total 43% of the roadless area and protect roadless values. Almost half the roadless area's values are mostly maintained by applying MPC 6.1 along the east flank of the area with some minor acreages of MPC 3.1 and 3.2. The 4.3 MPC is applied to 1,100 acres, and in this alternative that MPC mostly maintains roadless values, allowing only new trail construction. Development is allowed on about 9% of the area allocated to 4.4 and 4.5 MPCs.

In Alternative 7, no Wilderness is recommended for the Stansbury Mountain Roadless area. MPC 2.6 is applied to two large blocks adjacent to the south and north ends of Deseret Peak Wilderness that total 43% of the roadless area and protect roadless values as in Alternative 6. MPC 6.1 is also applied in the same areas as in Alternative 6, however, in this alternative the 6.1 MPC allows for timber harvest and road building, consequently these acres do not maintain roadless values. Minor acreages are allocated in MPCs 3.1a and 3.2u, which also mostly maintain roadless values. In this alternative development is also allowed on the 12% of the area allocated to 4.3, 4.4 and 4.5 MPCs.

Western Uintas Management Area

Nobletts

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - Located about 24 miles from Park City and 55 miles from Salt Lake City and a surface water public drinking source for Wasatch Front.
- Properly Functioning Condition – 3 - Nobletts roadless area is dominated by aspen and aspen-conifer communities. The area is entirely within an allotment and shows some effects from grazing, although conditions are
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – 2 - Goshawk, Northern three-toed woodpecker and other SAR species habitat present.
- Fish Species at Risk – 5 - This area contains isolated populations of cutthroat trout in Rock and Soapstone Creek.
- ROS – 1- 16% SPM, 0% SPNM.
- Landscape Character and Scenic Integrity – 5 - No evidence of past vegetation harvests or ghost roading. Scenic Attractiveness Level: Common. Typical of surrounding forested landscapes.
- Heritage Resources – 2 to 3 - No survey data. Rank based on professional judgment.
- Unique Characteristics – 1 - None identified.
- Size and Context - Overall Score for Size and Context – 1 – (Acres and Size: 1. Small (3113 acres WCNF, + 5693 Uinta NF roadless acres = 8806 total roadless acres.) Adjacency: 3. Surrounded or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Context: Uinta Mountains, 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. None.)

Summary Statement

- Several low and some high values. High values for public drinking water, fish SAR, and scenic attractiveness.

Effects on Individual Roadless Area

Nobletts – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	2,700	0	0	0	0	0	0
2.5	400	400	400	400	400	400	200
3.1	0	0	0	0	0	0	0
3.1A	0	0	0	0	0	0	300
3.2	0	2,600	2,700	0	0	2,600	0

3.2U	0	0	0	0	0	0	2,600
6.1	0	0	0	2,700	2,700	0	0

Nobletts – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
Rural	0	0	0	100	0	0	0	0
RN	400	3,100	3,100	3,000	3,100	3,100	2,600	2,600
SPM	0	0	0	0	0	0	500	500
SPNM	2,700	0	0	0	0	0	0	0

Nobletts – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	400	2,700	2,700	3,100	2,700	2,700	2,600	2,600
Snowmobile Not Allowed	2,700	400	400	0	400	400	500	500

Nobletts – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	3,100	3,100	2,700			400	
Mostly Maintains Roadless Values						2,700	2,900
Allows Development			400	3,100	3,100		200
Sum	3,100	3,100	3,100	3,100	3,100	3,100	3,100

Lakes

Inventory of Values

- Soil and Water – 5- Many small and some large wetlands throughout the area.
- Sources of Public Drinking Water – 5 - Located about 16 miles from Park City and 47 miles from Salt Lake City and a surface water public drinking source for Wasatch Front.
- Properly Functioning Condition – For the Lakes roadless area under this value, two areas are considered: the western and eastern portions of the area. – 3 - The western portion of this roadless area has been heavily impacted through historic grazing. Areas that were dominated by Tall Forb communities can be described as tarweed communities. The central and eastern portion of this roadless area, especially at higher elevations, are relatively undisturbed. 4 - The eastern portion of this roadless area has not been heavily impacted by grazing and has high diversity of subalpine ecosystems in good ecological condition.
- Vegetation Species at Risk - 2 - Utah ivesia occurs in this roadless area.

- Terrestrial Species at Risk – 4 - Lynx and wolverine habitat present. Goshawk and Northern three-toed woodpeckers present.
- Fish Species at Risk – 5 - This area has three metapopulations of cutthroat trout. These are Beaver, Smith and Morehouse and the headwaters of the Weber.
- ROS – 5 – 29% SPM, 62% SPNM.
- Landscape Character and Scenic Integrity – 3 - Looking at this roadless area as a whole unit it has an integrity level of Moderate because of the timber harvest units on the outside fringes of the unit. If those units were excluded the area would be rated as High. Cherry-stemmed roads found in the area affect its scenery. Scenic Attractiveness Level: Distinct, because of glaciation, high mountain lakes, scenic vistas and rock domes.
- Heritage Resources – 5 - Low survey data, but based on historic records and percentage of water, possibility of cultural resources is high.
- Unique Characteristics – 3 - Portions of four rivers found eligible in wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 5 – (Acres and Size: 5. Large (122,019 acres). Adjacency: 5. Area is so large as to be adjacent to a lot of different kinds of wild and developed areas. Interior of this area is very primitive, and still very large. Criteria considered, and given high score. Area tends to fall outside general rankings and criteria on the Forest due to its larger size. Contains settings like items 2, 3, and 4 in the criteria. Context: Uinta Mountains. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 5. (Scored highly based on rationale provided below that is outside criteria per se but with consideration of criteria.) Whole area defined as roadless is very large and contains numerous (about 20 cherry stems) around which the roadless area boundary was delineated given the mapping rules. These cherry stems significantly alter the roadless character of the parts into which they create access/impacts. Intrusions occur in Gardners Fork, over 4 miles; Smith Morehouse, over 4 miles; Red Pine Creek, over 4 miles; S. Fork Weber River, 2.5 miles; Swifts Canyon, 1 mile; Cedar Fork and Left Fork Beaver Creek, 2-3 miles; Upper Setting, 4 miles; Norway Flat, 5 miles; North Fork Trailhead, 1 mile. Nevertheless, the core of the roadless area within these incursions is still very large and not especially influenced by road intrusions.)

Summary Statement

- Mostly medium to high values. High values for soil and water, public drinking water, terrestrial SAR, fish SAR, heritage, semi-primitive experience, and size and context. Much of the area has high scenic integrity.

Effects on Individual Roadless Area

Lakes – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	119,200	71,900	0	0	0	26,300	38,000
2.5	2,600	2,600	2,600	2,600	2,600	2,600	2,600
2.6	0	4,500	60,400	0	0	33,300	27,500
3.1	0	5,300	7,600	0	3,300	9,100	0
3.1A	0	0	0	0	0	0	2,100
3.1W	0	0	0	0	0	0	9,300
3.2	0	23,700	33,300	0	0	33,100	0
3.2U	0	0	0	0	0	0	27,000
4.1	0	2,800	0	58,900	60,400	0	0
4.2	0	0	0	0	0	2,800	0
4.3	0	4,900	8,000	0	0	4,700	4,500
4.4	0	5,000	5,800	0	5,200	5,800	5,800
4.5	0	0	0	0	600	0	0
5.1	0	0	3,000	0	0	3,000	4,000
5.2	0	0	0	20,100	15,000	0	0
5.2/6.2	0	0	0	0	16,000	0	0
6.1	0	1,200	1,200	0	18,700	1,200	1,200
6.2	0	0	0	40,100	0	0	0

Lakes – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
Rural	0	0	0	0	0	0	0	0
RN	2,600	12,800	15,000	64,300	15,000	14,600	10,600	10,600
SPM	0	22,600	32,200	0	32,200	32,200	36,000	36,000
SPNM	119,200	86,500	74,600	57,600	74,600	75,000	75,300	75,300

Lakes – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	19,800	115,300	121,900	115,300	90,000	115,300	115,300
Snowmobile Not Allowed	121,800	102,000	6,500	0	6,500	31,800	6,500	6,500

Lakes – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	121,900	109,100	101,300			62,200	65,500
Mostly Maintains Roadless Values		7,700		58,900	60,400	53,800	38,400
Allows Development		5,000	20,600	62,900	61,500	5,800	18,000
Sum	121,900	121,900	121,900	121,900	121,900	121,900	121,900

Additional Comments on Effects for High Value Roadless Area

In Alternatives 1, 2, and 6 the intent of the Roadless Areas Conservation Rule is applied and neither timber harvest nor road construction is allowed.

In every Alternative, a band of MPC 2.5 is applied to about 2,600 acres (2% of the roadless area) along the Mirror Lake Highway to protect outstanding scenic qualities of the Scenic Byway. Development is allowed in this acreage.

In Alternative 1, 98% of the acreage in the Lakes Roadless area is recommended for Wilderness, maintaining roadless area values.

In Alternative 2, a relatively large Wilderness recommendation of 71,900 acres maintains roadless values, as does 29,000 acres of MPCs 3.1 + 3.2 on the west side of the recommended Wilderness, and 4,500 acres of MPC 2.6 along the area's northern and eastern edges. 4.1 and 4.2 MPCs are allocated to 6% (7,700 acres) on the northeast side of the area next to the Mirror Lake Highway corridor, and this allocation mostly maintains roadless values, allowing only new trail construction. 4.3-4.5 MPCs for motorized and developed recreation are allocated on 5,000 acres in the southeast portion of the area where development is allowed.

In Alternative 3, no Wilderness is recommended, but MPC 2.6 is applied to about ½ the Lakes roadless area and maintains roadless values for the core of area. Similarly, the combinations of MPCs 3.1 (6%), MPC 3.2 (19%) maintain large amounts of the area's roadless values. MPCs 4.3, 4.4, 4.5, 5.1, and 6.1 allow development to meet those different prescriptions on about 17% of the Lakes roadless area.

In Alternative 4 MPC 4.1 backcountry non-motorized summer recreation is applied to 48% of the area that had been 2.6 MPC in Alternative 3. In this alternative, roadless values are mostly maintained, as new trail construction is allowed. New trail construction might affect the area by allowing more recreation use. Development is allowed for the rest of the roadless area, mostly through the application of MPC 5.2 on 16% of the lands on the north, east and south sides of the area for timber growth and yield, and 6.2 on 33% of the lands along the west side for livestock forage production.

In Alternative 5, there is a slightly larger allocation of MPC 4.1 for backcountry non-motorized summer recreation for the core of the Lakes roadless area (50%) than in Alternative 4; this area mostly maintains roadless values, allowing only new trail construction. Development is allowed on the remaining acreage in the Lakes roadless area with 3% in MPC 3.1 for aquatic habitat/watershed restoration (Left Fork Beaver Creek and Pinon Canyon areas) 25% in MPC 5.2 for timber growth and yield on the north side, and 5.2/6.2 timber growth-yield/rangeland forage production to the northwest; and 15% for MPC 6.1 for non-forested vegetation maintenance or restoration.

In Alternative 6 Wilderness is recommended for 26,300 acres or 22% of the area. This plus 33,300 acres of MPC 2.6 make up a total of 49% of the area that has roadless values maintained. 53,800 acres have roadless values mostly maintained by allocating 27% of the area to MPC 3.2, 7% to MPC 3.1, and 2% to MPC 4.2. In this alternative MPCs 5.1 and 6.1 mostly maintain roadless character on about 3% of the area's acreage by not allowing timber harvest or road construction. Development is allowed in 5% of the area through the allocation to MPCs 4.4 and 4.5 for facilities associated with dispersed motorized and developed recreation.

In Alternative 7 a Wilderness recommendation of 38,000 acres and 2.6 MPC of 27,500 acres maintain roadless values in 54% of the Lakes roadless area. 13% of the area allows development through a combination of 4.3-4.5 MPCs in the southeast portion of the area and in the Weber River and Gardners Fork drainages, and acreages of 5.1 and 6.1 MPCs. Roadless values are mostly maintained by allocation to 3.1a, 3.1w and 3.2u MPCs to 32% of the area where constraints on development activities are specific to the prescriptions in this alternative.

Eastern Uintas Management Area

High Uintas

Inventory of Values

- Soil and Water –5 - Many small and some large wetlands along streams within the area.
- Sources of Public Drinking Water – 5 - Located about 28 miles from Park City and 59 miles from Salt Lake City and southeastern part a surface water public drinking source for Wasatch Front.
- Properly Functioning Condition – In general the entire High Uintas roadless area has low age class diversity with most forested stands in the mature age class. Some areas have many acres of the wet meadow vegetation type that are not common elsewhere on the forest. Dyers woad is present primarily in the Stillwater/Hayden Fork portion, but Canada and musk thistle are more widespread and are next to, and potentially in, the roadless area. Also, for the High Uintas roadless area information unique to several subrareas (related to drainages) are considered for this value. 2 - Area between Duchesne and Provo River/Lost Creek - There is some age class diversity, although minor, in the forested communities; nearly all of the forested stands are mature and nearly all aspen is being replaced by conifer. 2 - Stillwater/Hayden Fork – There is little age class diversity in the forested communities. Nearly all of the forested stands are mature with some sapling-small tree stands near the wilderness boundary. 2 - East Fork Bear River – There is little age class diversity in the forested communities. Nearly all of the forested stands are mature with some sapling-small tree stands. 4 - Blacks Fork – There is very little age class diversity in the forested communities. Nearly all of the forested stands are mature. This area has over 1700 acres of the wet meadow vegetation type. 2 – West Fork Smiths Fork – There is very little age class diversity in the forested communities. Nearly all of the forested stands are mature. 3 - Henrys/Gilbert – There is very little age class diversity in the forested communities. Nearly all of the forested stands are mature. This portion has over 300 acres of the wet meadow vegetation type. 2 - Beaver Creek - There is very little age class diversity in the forested communities. Nearly all of the forested stands are mature. This portion has approximately 200 acres of the wet meadow vegetation type. 2 - Burnt Fork/Thompson/Kabell – There is very little age class diversity in the forested communities. Nearly all of the forested stands are mature.
- Vegetation Species at Risk - 2 - Area between Duchesne and Provo River/Lost Creek Rockcress draba is present and habitat for Utah Ivesia is nearby. 1 - Stillwater/Hayden Fork – No SAR plants present. 2 - East Fork Bear River – No SAR plants are present, but rockcress draba occurs nearby and has potential to occur. 4 - Blacks Fork – Siberian aster, a globally common species, but a species rare in Utah is present. In addition, Uinta beardtongue is also present at upper elevations. 1 - Smiths Fork - No SAR plants present. 1 - Henrys/Gilbert - No SAR

plants present. 1 - Beaver Creek - No SAR plants present. 1 - Burnt Fork/Thompson/Kabell - No SAR plants present.

- Terrestrial Species at Risk – 4 - Lynx and wolverine habitat present. Goshawk and Northern three-toed woodpeckers present.
- Fish Species at Risk – 5 - This area contains a number of metapopulations of Colorado River and Bonneville cutthroat trout.
- ROS – 5 – 14% SPM, 64% SPNM. High quality backcountry values.
- Landscape Character and Scenic Integrity – 4 - Ghost roads on eastern edge of this area. Scenic Attractiveness Level: Common for mid-elevations in the Uintas with lodgepole pine and with some fir.
- Heritage Resources – 5 - Most survey data of the forest. Very high probability of historic tie hack sites as well as prehistoric sites.
- Unique Characteristics – 5 - Portions of 15 rivers found eligible in wild and scenic river inventory.
- Size and Context - Overall Score for Size and Context – 5 – (Acres and Size: 5. Large (103,071(WCNF roadless)+ 460,000 (High Uintas Wilderness) + circa 250,000 adjacent Ashley NF roadless) (By far the largest contiguous roadless/wilderness area on the Forest and state, and among the larger in the lower 48.) Adjacency: 5. Immediately adjacent to designated Wilderness. Context: Rank 3. Uinta Mountains. 1. Much other roadless or Wilderness in section. Integrity: Cherry Stems, 1. More than 5 and/or very long and intrudes deeply. (At least a dozen cherry stems or peninsulas of roaded corridor extend into the High Uintas Roadless area. Each is a road(s) corridor up a canyon or into the area, approaching higher elevations and eventually butting into steeper lands. The area is too large to not be subdivided when considering management recommendations and applying prescriptions, however if a generalization must be made about the whole (and from a roadless perspective) it has very great value by its size alone.)

Summary Statement

- (Refer to detailed evaluation for some drainage by drainage assessments of values.) Mostly high values. For Vegetation SAR, Blacks Fork drainage has high value, all others have low values. High values for public drinking water in Provo River drainage and for wetlands. High values for fish SAR, scenic integrity, context and size.

Effects on Individual Roadless Area

High Uintas – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	98,200	29,300	18,200	0	0	20,100	20,600
2.5	3,100	3,100	3,100	3,100	3,100	5,400	4,800
2.6	0	12,300	11,900	0	2,000	9,600	10,800
3.1	0	6,300	2,200	100	300	4,500	0
3.1A	0	0	0	0	0	0	4,600
3.1W	0	0	0	0	0	0	100
3.2	0	16,000	18,700	0	13,200	24,300	0

3.2D	0	0	0	0	0	0	17,400
3.2U	0	0	0	0	0	0	1,400
4.1	0	18,700	16,400	18,100	7,100	12,700	13,000
4.2	0	2,000	2,000	0	0	2,400	2,400
4.3	1,700	6,400	6,400	0	3,000	6,400	7,200
4.4	0	5,100	5,600	800	11,000	5,500	5,800
4.5	0	300	0	0	0	0	0
5.1	0	3,200	14,700	0	0	12,000	14,700
5.2	0	0	3,600	76,300	61,800	0	0
6.1	0	200	200	0	1,000	200	200
6.2	0	0	0	4,500	400	0	0

High Uintas – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	3,300	23,600	25,200	79,000	29,300	25,300	22,100	22,100
SPM	1,500	10,600	11,100	2,300	56,200	11,100	14,200	14,200
SPNM	98,300	68,800	66,800	21,800	17,500	66,700	66,700	66,700

High Uintas – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	1,600	21,100	43,800	81,300	102,700	57,000	57,800	80,100
Snowmobile Not Allowed	101,400	82,000	59,300	21,800	400	46,000	45,200	23,000

High Uintas – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	103,100	70,500	50,900		2,000	35,000	33,000
Mostly Maintains Roadless Values		27,100	18,400	18,100	7,100	62,500	21,500
Allows Development		5,500	33,700	84,900	94,000	5,500	48,600
Sum	103,100	103,100	103,000	103,000	103,000	103,000	103,100

Additional Comments on Effects for High Value Roadless Area

In Alternatives 1, 2, and 6 the intent of the Roadless Areas Conservation Rule is applied and neither timber harvest nor road construction is allowed.

In every Alternative, a band of MPC 2.5 is applied to about 3,100 to 5,400 acres (3% to 5% of the roadless area) along the Mirror Lake Highway to protect outstanding scenic qualities of the Scenic Byway. Development is allowed in this acreage.

In Alternative 1, 98% of roadless area values in the High Uintas roadless area are protected by allocation to recommended Wilderness.

In Alternative 2, the Wilderness recommendation in three areas on the north slope maintains 29% of roadless values. MPC 2.6 maintains another 13%. MPCs 3.1-3.2, 5.1 and 6.1 maintain an additional 26% of the area's roadless value. Only 5% of the area allows development; this in MPCs 4.4 and 4.5. MPCs 4.1-4.3 mostly maintain roadless values on 26% of the High Uintas roadless area, mostly in the East Fork of the Bear, Stillwater and Hayden Forks.

In Alternative 3, 18% of the roadless area acres are maintained through Wilderness recommendation of two areas on the north slope. Other acreage is maintained for its roadless value by MPC 2.6 (11%) and MPCs 3.1-3.2 (20%) especially in the East Fork Blacks Fork and further east. MPCs 4.1-4.2 near Stillwater Fork, along the Middle Fork Blacks Fork and Bridger Lake mostly maintain roadless values on 18% of the area by not allowing road construction and timber harvest, but allowing some new trail construction and minor recreation construction. Development is allowed in 33% of the roadless area: about 12,000 acres in 4.3 and 4.4 MPCs, and an additional 18,000 acres in 5.1 MPC (mostly in checkerboard ownership) and 5.2 MPC (mostly on the east side of the area).

In Alternative 4, 82% of the High Uintas roadless area is available for development as mostly defined by MPC 5.2 for timber growth and yield (74% of the area), and with the remaining acreage for livestock forage production, MPC 6.2, or minor dispersed motorized recreation acreage, MPC 4.4. The remaining 18% of the area has roadless values mostly maintained through allocation to MPC 4.1.

In Alternative 5, 91% of the High Uintas roadless area allows development: MPC 5.2 is applied to 60%, emphasizing timber growth and yield, 4.3 and 4.4 MPCs are applied to 14%, 13% is in 3.2MPC that allows development in this alternative. Only 2,000 acres have roadless values protected by MPC 2.6. About 7,100 acres in MPC 4.1 mostly maintain roadless values in the Upper Stillwater Fork by limiting development to new trail construction.

In Alternative 6 the Wilderness recommendation of two north slope areas maintains roadless values for 19% of the area. Additional acreage of MPC 2.6 maintains another 9% of the area's roadless character. MPCs 3.1-3.2, 4.1-4.3, 5.1-5.2, and 6.1-6.2 mostly maintain roadless values on 61% of the roadless area. 5% of the area allows development which is attributable to MPC 4.4 allocation.

In Alternative 7, the Wilderness recommendation maintains 20% of the High Uintas roadless area values; 10% are maintained by allocation to MPC 2.6. Development is allowed on 49% of the area's acreage acres divided among MPC 4.3 and 4.4 (13%), MPC 5.1 (14%) and MPC 3.2d (17%). The roadless values of 21% of the High Uintas roadless area are mostly maintained in allocations to MPCs 4.1 (13%), 4.2 (2%), and 4.3 (7%) in Bridger Lake, East Fork Blacks Fork, and near Stillwater Fork. In this alternative 2,220 acres in MPCs 4.1 and 4.2 allow oil and gas leasing with Controlled Surface Use; in this case roadless values would not be mostly maintained.

Widdop Mountain

Inventory of Values

- Soil and Water – 1 - Few small wetlands along small narrow streams.
- Sources of Public Drinking Water – 5 - Located in the Burnt Fork drainage tributary to the Henrys Fork and eventually drain into Flaming Gorge. It is about 30 miles from Flaming Gorge, a surface water public drinking source.
- Properly Functioning Condition – 3 - This roadless area is dominated by Douglas-fir on the north-facing portions of the limestone outcrops that are a common component. Sagebrush communities are common on the south-facing slopes. The entire area is included in cattle allotments.
- Vegetation Species at Risk - 1 - No known SAR plants occur within this roadless area.
- Terrestrial Species at Risk – Score for Criteria – 2 - Lynx habitat present.
- Fish Species at Risk – 5- Cutthroat trout are found in Thompson Creek and the Burnt Fork.
- ROS – 5 – 90% SPM, 0 SPNM.
- Landscape Character and Scenic Integrity – 3 - Appears like that there has been considerable timber harvest in the past and much of the area has not regenerated. Timber harvest evident in clear cuts and past thinning project just north of Hole in the Rock, with many unconstructed travelways present. Scenic Attractiveness Level: Common with some exceptions in some old Douglas fir and sagebrush areas. Limestone outcrops present are unique for the North Slope.
- Heritage Resources – 3 to 4 - Low data, but moderate to high potential for mining and Native American sites.
- Unique Characteristics – 1 - Portion of one river found eligible in wild and scenic river inventory.
- Size and Context – Overall Score for Size and Context – 1 - (Acres and Size: 1. Small (7,997 acres). Adjacency: 2. Isolated near rural or within general national forest context. Context: Uinta Mountains. 1. Much other roadless or Wilderness in section.Integrity: Cherry Stems, 2. 3 or 4 and/or short and short intrusions. (1.4 mileintrusion near Burnt Fork.)

Summary Statement

- Widdop Mountain – Several low values with medium values for PFC and heritage, and high values for public drinking water and fish SAR.

Effects on Individual Roadless Area

Widdop Mountain – Management Prescriptions (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1.5	8,000	0	0	0	0	0	0
3.2	0	8,000	7,300	0	0	7,300	0
3.2D	0	0	0	0	0	0	7,300

5.1	0	0	0	0	0	700	700
5.2	0	0	700	2,400	2,600	0	0
6.1	0	0	0	0	5,400	0	0
6.2	0	0	0	5,500	0	0	0

Widdop Mountain – ROS (Acres)

ROS	Alt 1	Alt 2	Alt 3	1985 Plan Alt 4	Alt 5	Alt 6	Alt 7	Existing Condition
RN	0	5,600	5,600	8,000	5,600	5,600	800	800
SPM	0	2,400	2,400	0	2,400	2,400	7,200	7,200
SPNM	8,000	0	0	0	0	0	0	0

Widdop Mountain – Winter Recreation (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4 1985 Plan	Alt 5	Alt 6	Alt 7	Existing Condition
Snowmobile Allowed	0	100	0	8,000	100	100	100	100
Snowmobile Not Allowed	8,000	7,900	8,000	0	7,900	7,900	7,900	7,900

Widdop Mountain – MPCs that Maintain Values, Mostly Maintain Values, or Allow Development (Acres)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintains Roadless Values	8,000	8,000	7,300				
Mostly Maintains Roadless Values						8,000	
Allows Development			700	8,000	8,000		8,000
Sum	8,000	8,000	8,000	8,000	8,000	8,000	8,000

Appendices C-1 and C-2 - Roadless Area Maps

The following pages give maps of inventoried roadless areas discussed in this appendix.

White Pine	116
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Stansbury Management Area	118
Stansbury Mountains	119
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APPENDIX D - 1

Forestwide Management Direction

The National Forest Management Act requires us to develop management direction for each National Forest. This "direction" is to be expressed through goals, objectives, standards, guidelines, management prescriptions, desired future conditions, and monitoring and evaluation requirements for the forest. Some direction logically can be applied to an entire national forest, while other direction should apply only to specific areas of the forest. For this reason, **maps** are used with this FEIS to show where particular direction would apply by alternative. Management prescriptions, recreation opportunities (summer and winter), scenery management, and oil and gas leasing availability are mapped for each alternative analyzed in detail. These maps, along with the narrative descriptions contained in this Appendix are the basis for describing the key choices made in each alternative and displaying important differences between the alternatives.

The set of maps for each alternative are best understood by first reviewing the standardized categories and descriptions that go with each map legend. This **FEIS Appendix- D** provides detailed descriptions of the categories. The maps and their accompanying descriptions for the selected Alternative (7) are a key part of the Revised Forest Plan.

Relationships between Map Layers

The Forestwide Management Direction for this FEIS and the Revised Forest Plan includes multiple map layers with accompanying definitions and management direction. The primary maps are Management Prescription (MP), Recreation Opportunity Spectrum (ROS), Winter Recreation (WR), and the Scenery Management System (SMS). Management Prescriptions define the primary allowable land use with the other three maps further defining other intended management for a given land area. In most instances the four map layers are compatible by design. However, in the instance of a conflict between direction for a Management Prescription and any of the three other layers, the Management Prescription takes precedence. If site-specific analysis identifies a conflict, the Forest Plan Maps may need to be amended to bring the other layers into consistency with the overlying Management Prescriptions. In addition there are Transmission Corridor maps that do not vary by Alternative tied to Forestwide Guideline 82, and Oil and Gas Leasing maps that do vary by Alternative for the North Slope Uinta Mountains.

Management Prescription Categories

Management Prescriptions are defined as "management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives." Management Prescription Categories are intended to provide a general sense of the management or treatment of the land intended to result in a particular condition being achieved or set of values being restored or maintained. These categories were developed based on experience and learning from the original development of Forest Plans in the 1980's. In more

recent times, especially as issues that cross boundaries or involve very large land areas have arisen, the need for improving consistency across multiple national forests was identified. In the 1993 Intermountain Region Desk Guide for plan revision, a menu of Management Prescription Categories was provided to address the need for consistency while allowing each planning team to develop prescriptions within the categories, meeting specific needs of that Forest. The original Categories were revised in 1998 forming the basis for further refinement and mapping contained in the Wasatch-Cache National Forest Proposed Action for Forest Plan Revision, September 1999. These have been further refined during the process of developing this FEIS.

Each Management Prescription provides a listing of allowed activities as well as identification of special factors based on the goals and needs or opportunities in an area. Each Category identifies emphasis and focus, highlighting considerations that must be included in the harmonious and coordinated management of the various resources there, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, etc. consistent with the definition of multiple-use. Prescriptions are meant to identify the tools/activities that can be used to achieve objectives. ***Emphasis* as used in these Prescriptions is defined as focus or highlighting, not exclusive or "dominant" use. In the event of a conflict between uses, resolution will be based on the specific merits of the situation rather than assuming that the Prescription implies a "trumping" of one resource over another. The entire Management Direction Package for the area must be considered, not just the Prescription.**

Consistency of Prescriptions with Multiple-Use and Other Laws

The Multiple-Use Sustained-Yield Act of 1960 defines the term "multiple-use" to mean: the management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output." (P.L. 86-517, 74 Stat.215; 16 U.S.C. 528(note), 528-531, Sec. 4. (a).

Highlighting of considerations through emphasis in a Prescription Category may also be based on needs and opportunities tied to other key laws that guide and direct management of the National Forests. Some of these include the Forest and Rangeland Renewable Resources Planning Act, National Forest Management Act of 1976, Clean Water Act, Clean Air Act, Wilderness Act, Endangered Species Act of 1973, Wild and Scenic Rivers Act, Mining and Minerals Policy Act of 1970, National Environmental Policy Act, National Historic Preservation Act, North American Wetlands Conservation Act, and the Intermodal Surface Transportation Efficiency Act of 1991 (Scenic Byways Program and Symms National Recreational Trails Act of 1991). For example Prescription Category 2 has subcategories directly tied to the Wild and Scenic Rivers Act.

Another important aspect of the Multiple-Use Act as well as the Forest and Rangeland Renewable Resources Planning Act and National Forest Management Act is the need for periodic adjustments to conform to changing needs and conditions. The monitoring components of the Forest Plan are designed to surface indicators of needs for change and to initiate actions to adjust management.

As described above, the Prescription Categories are not intended to stand-alone. They are one part of the Management Direction Package that also includes goals, objectives, desired future conditions, standards, guidelines, implementation direction, and monitoring and evaluation requirements. Where an activity is allowed in the Prescription, the standards and guidelines provide specific parameters within which the activity must be managed.

MPC maps of alternatives can be found in the Map Packets.

Allowed Activities Table Heading Explanations

(See Table of Allowed Activities for each Alternative in Chapter 2 of the FEIS.)

Timber Harvest refers to commercial removal of vegetation for a variety of purposes including providing raw wood materials, improving wildlife habitat, adjusting age class distribution to mimic historic disturbance regimes, providing fire-resistant landscapes and commercial thinning.

Vegetation/Fuel Treatment refers to a host of activities including, thinning, seeding; planting; mechanical treatments such as cutting by hand with chainsaws, cutting using tracked eqiupment or equipment on wheels for roller-chopping, chaining, crushing, or chipping; chemical application; and biological treatments (i.e., specialized grazing regimes). These are methods used to achieve a broad range of multiple-use objectives including maintaining or restoring healthy ecosystems, reducing likelihood of unwanted wildfire, removing public safety hazards, reducing potential for high-intensity wildfires and resulting erosion, improving forage or browse production, restoring native plant communities, improving or restoring watersheds, and providing for specific elements of terrestrial or aquatic wildlife habitats.

Prescribed Fire refers to any fire ignited by management actions to meet specific objectives. A written, approved presribed fire plan must exist, and site-specific NEPA analysis requirements must be met prior to ignition. Prescribed fire plans are docments prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription). Prescribed fire activities include actuallly lighting a fire using a fire accelerant with ground or aviation equipment and personnel; and may include the following: removal or piling of vegetation to secure perimeter lines, clearing areas for helicopter operations, clearing holding lines to bare mineral soil using hand tools or heavy eqiupment (i.e., bull dozers), using fire resistant foam or water on holding lines, constructing temporary camps for base operations, using aviation resources for fire retardant or water drops to reduce high-intensity fire behavior, closing areas to livestock grazing before and after burning, and closing roads and areas to the public before and after burning.

Wildland Fire Use is the management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in the Fire Management Plan. The term does not include fires that are human-caused (either accidental or arson) that are considered unwanted wildland fires and that must be suppressed. It also does not include the use of those fires that are management ignited, referred to as prescribed fires. Use of wildland fire requires a Wildland Fire Implementation Plan which is a progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits.

Road Construction refers to activity that results in the addition of forest classified or temporary road miles. **Road** is defined as a motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary. (FSM 7705)

Note: Where road construction is <u>not allowed</u> by a Management Prescription the responsible official may authorize road construction or reconstruction when:
a. A road is needed to protect public health and safety in cases of an imminent threat of flood, fire, or other catastrophic event, that without intervention would cause the loss of life or property;
b. A road is needed to conduct a response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to conduct a natural restoration action under CERCLA, section 3d11 of the Clean Water Act, or Oil Pollution Act;
c. A road is needed pursuant to reserved or outstanding rights, or as provided by statute or treaty; or
d. Realignment is needed to prevent irreparable resource damage by a classified road. The road must be deemed essential for public or private access, natural resource management, or public health and safety, and the resource damage associated with the road cannot be corrected by maintenance.

New Trail Construction refers to development of any “pathway for foot, horse, or trail vehicles “(bikes, scooters, snomobiles, and all terrain vehicles[motorized OHV 50” or less]) FSM 2305.05, WO Amendment 2300-94-3, 7/8/94, pg. 8-9. and FSH 2309.18 WO Amendment 2309.18-91-2, 11//8/91 pg. 1-2). To determine whether a trail is open to motorized or mechanized uses refer to District Travel Management Plans.

Note: In Prescriptions where new trail construction is <u>not allowed</u>, reconstruction and/or realignment to correct resource impacts from existing trails <u>is</u> allowed.

Grazing refers to grazing of forage by permitted livestock managed under an approved Allotment Management Plan and terms of a livestock grazing permit. Forestwide and management prescription standards and guidelines provide direction for grazing management until site-specific desired conditions and/or objectives can be developed. Grazing may also include use of livestock under contract to reduce fuels.

New Recreation Development refers to major structural public use facilities such as campgrounds and trailheads. It does not refer to construction within already established developed recreation sites. Trails and single restrooms are not considered recreation development for these descriptions.

Summary of Management Prescription Categories

1.0 Wilderness

1.1 Existing Wilderness - Opportunity Class I
1.2 Existing Wilderness - Opportunity Class II
1.3 Existing Wilderness - Opportunity Class III
1.4 Existing Wilderness - No Class
1.5 Recommended Wilderness

2.0 Special Management Areas

2.1-2.3 Wild, Scenic, and Recreational Rivers (not used on revision maps)
2.4 Research Natural Areas
2.5 Scenic Byways
2.6 Undeveloped Areas
2.7 Special Interest Areas and Special Areas

3.0 Protection, Maintenance or Restoration of Aquatic/Watershed or Terrestrial Integrity

3.1 Aquatic Habitat/Watershed Emphasis (a- Aquatic, w- Watershed)
3.2 Terrestrial Habitat Emphasis (d- Development allowed, - Undeveloped).

4.0 Multiple Resource Uses With Recreation Needs and Opportunities

4.1 Emphasis on Backcountry non-motorized recreation settings.
4.2 Emphasis on Dispersed non-motorized recreation settings.
4.3 Emphasis on Backcountry Motorized recreation settings
4.4 Emphasis on Dispersed Motorized recreation settings.
4.5 Emphasis on Developed Recreation Areas

5.0 Multiple Resource Uses With Forested Vegetation Management Needs and Opportunities

5.1 Emphasis on maintaining or restoring forested ecosystem integrity while meeting multiple resource objectives.
5.2 Emphasis on managing timber for growth and yield while maintaining or restoring forested ecosystem integrity.

6.0 Multiple Resource Uses With Rangeland Vegetation Management Needs and Opportunities

6.1 Emphasis on maintaining or restoring non-forested ecosystem integrity while meeting multiple resource objectives.
6.2 Emphasis on managing for livestock forage production while maintaining or restoring non-forested ecosystem integrity .

7.0 Intermingled Public/Private Lands (This prescription accompanied one of the other prescriptions in earlier versions. It has been eliminated because it made maps difficult to read and because private lands are already shown clearly on the maps.)

8.0 Concentrated Development Areas
8.1 Mineral Development Emphasis

Management Prescription Categories

1.0 - Wilderness

Theme

This prescription includes areas designated by Congress as Wilderness and areas recommended by the Forest Service for Wilderness designation. Management emphasis is on maintaining wilderness attributes, including natural appearance, natural integrity, opportunities for solitude, opportunities for primitive recreation, and any identified special features.

Although the theme for management prescription category 1 is wilderness, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, provide the limits or constraints to guide this coordinated management. As long as other allowed (see table of Allowed Activities in each Alternative) resource activities, such as livestock grazing or fire use, meet the direction in the standards and guidelines, then they are consistent with the Wilderness and Recommended Wilderness prescription categories.

Each designated Wilderness Area may have a management plan developed to provide additional direction specific to that area. At the time of this revision only one, the High Uintas Wilderness, has such a management plan.

Management Emphasis You Will See

The area is managed to allow natural processes to prevail in adherence with the 1964 Wilderness Act and the 1984 Utah Wilderness Act. Timber harvest, vegetation treatment, road building, new recreation development, and new trail construction are not allowed within these prescriptions. Grazing and wildland fire use are allowed. Prescribed fire is allowed in these prescriptions in some FEIS Alternatives but not in others.

1.1 Existing Wilderness - Opportunity Class I
1.2 Existing Wilderness - Opportunity Class II
1.3 Existing Wilderness - Opportunity Class III
1.4 Existing Wilderness - No Class
1.5 Recommended Wilderness

1.1 Opportunity Class I: This area in existing wilderness is characterized by an unmodified natural environment. Human induced change is temporary and minor. Outstanding opportunities for solitude and unconfined recreation are available for visitors, who travel in small groups, practice excellent wilderness ethics and spend extra effort to leave no trace. Encounters with others are rare.

1.2 Opportunity Class II: This area in existing wilderness is characterized by predominately unmodified natural environment. Human induced change is evident but will recover (slowly in higher elevation areas). Outstanding opportunities for solitude and unconfined recreation exist. Encounters with others are more frequent than Class I.

1.3 Opportunity Class III: This area in existing wilderness is characterized by predominately unmodified natural environment, but impacts could persist from year to year. During peak season and in popular areas concentrated use is more common and opportunities for solitude and unconfined recreation more limited.

1.4 Existing Wilderness - No Class Assigned: This area in existing wilderness is managed within the intent of the Wilderness Act but with no delineation of opportunity class or recognition of varying levels of opportunities for solitude available (used only in the No action Alternative 4)

1.5 Recommended Wilderness: These are areas recommended for wilderness. They were identified through the Forest Plan revision roadless area inventory, evaluation and recommendation process. This analysis is required by the National Forest Management Act (NFMA) planning regulations and the 1984 Utah Wilderness Act. Congress retains the final authority for designating wilderness areas. For areas recommended as wilderness, wilderness characteristics must be protected until Congress takes final action (FSH 1909.12,7.31). These areas are managed to maintain the characteristics qualifying them as capable and available for wilderness recommendation. Existing use of snowmobiles is allowed in Alternative 7; this activity must not result in long-term changes to the wilderness character.

2.0 – Special Management Areas

Theme

This prescription includes areas that have been or will be administratively or Congressionally designated for the conservation of specific values. These areas are Wild and Scenic Rivers and their corridors, Research Natural Areas, Forest Service Scenic Byways, Special Interest Areas and Specially Designated Trails. Management emphasis is on maintaining, enhancing, or restoring those values for which the area was established or designated.

Although the theme for management prescription category 2 is special management areas, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, the limits or constraints to guide this coordinated management. As long as other allowed (see table of

Allowed Activities in each Alternative) resource activities, such as livestock grazing, fire use, or road construction meet the direction in the standards and guidelines, then they are consistent with the Special Management Area prescription category.

Management Emphasis You Will See

2.1 - 2.3 Wild and Scenic Rivers: Wild (2.1), Scenic (2.2), and Recreational (2.3) Rivers include land corridors that extend 1/4 mile from each bank. Rivers and their corridors found suitable as additions to the Wild and Scenic Rivers System are managed to protect their free-flowing waters and existing or potential outstandingly remarkable values. Suitability determination is not part of decisions being made in the Wasatch-Cache National Forest Plan Revision. These Prescription numbers will not be used until such time as suitability work is completed, however eligible segments will be managed according to standards included in the Proposed Forest Plan. See Appendix VIII of the Revised Forest Plan.

2.4 Research Natural Areas: Manage existing and proposed Research Natural Areas to protect their unique and/or representative qualities. Vegetation treatment and fire use is limited to circumstances where these activities help perpetuate the unique and/or representative ecosystem. Limit human-induced effects as much as possible for the purpose of using the ecotype as a benchmark from which to measure human-induced effects elsewhere.

Each designated Research Natural Area may have a management plan developed to provide additional direction specific to that area. At the time of this revision no RNA's have management plans.

2.5 Scenic Byways: Manage Scenic Byways to protect and maintain their outstanding scenic quality. Scenic Byway Corridor Management Plans may be developed for each designated Byway. Timber harvest is not allowed. Vegetation and fuels treatments are limited to circumstances where these activities are necessary to maintain or enhance the scenic setting. Grazing and wildland fire use are allowed. Allowance of prescribed fire, road construction, new recreation development and new trail construction varies by alternative in the FEIS.

2.6 Undeveloped Areas: Manage to protect undeveloped landscapes in a manner other than formal recommended wilderness. Although other uses and activities may occur, the primary emphasis is protection to assure the values and unique qualities associated with undeveloped areas are recognized and preserved. No new development or activities that would alter the landscape or character are allowed, however use of motorized equipment (such as chainsaws for trail clearing) is allowed.

Public use of motorized vehicles in non-snow seasons within this prescription is based on open designated routes shown on District Travel Management Plans. In winter, allowance for motorized use varies by alternative in the FEIS (See maps of Winter Recreation opportunities). Timber harvest, road construction, new recreation development, and new trail construction are not allowed. Grazing, prescribed fire and wildland fire use are allowed however mechanical fuel treatments are not allowed. Vegetation treatment is limited to fire use intended to mimic conditions within the historic range of variability.

2.7 Special Interest Areas and Special Areas: Manage to protect particular values or unique qualities of special interest. The intent for **Special Interest Areas** is "to protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, palentological, or other special characteristics. To classify areas that possess unusual recreation and scientific values so that these special values are available for public study, use, or enjoyment" (FSM 2360.2). The intent for **Special Areas** are: "To protect and manage for public use and enjoyment, special recreation areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or uniques values." (FSM2372.02)

Special Interest and Special Areas may have management plans developed to address specific needs and opportunities for the individual area. Currently there are no designated special areas in the Wasatch-Cache National Forest.

Timber harvest, road construction, and new recreation development are not allowed. Vegetation/fuels treatments and prescribed or wildland fire use are allowed in circumstances where these activities help perpetuate the unique ecosystem. New trail construction is allowed if associated with resource interpretation and public study, use, or enjoyment. Allow manipulative restoration where needed for scientific study and increased public understanding of the unique values of the area.

3.0 Multiple Resource Uses where Aquatic/Watershed and Terrestrial Habitat Integrity are emphasized

Theme

This prescription includes lands where management emphasis is on maintaining or restoring aquatic/watershed and terrestrial habitat integrity. **Integrity** refers to the degree to which the elements of habitat and the ecosystem functions that link them together and sustain habitat values are complete and capable of performing desired functions. Although other uses and activities are allowed, the primary management needs and opportunities are to provide high quality watershed conditions, fish and aquatic habitats, and wildlife habitats that allow proper functioning of ecosystems and sustain biological diversity and population viability. Commodity production is allowed as part of management activities designed to improve or maintain aquatic habitats, watershed conditions and terrestrial habitats.

Although the theme for management prescription category 3 is aquatic/watershed and terrestrial habitat integrity, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, provide the limits or constraints to guide this coordinated management. As long as other allowed (see Table of Allowed Activities for each Alternative) resource activities, such as livestock grazing, fire use, or road construction meet the direction in the standards and guidelines, then they are consistent with the habitat integrity prescription category.

Management Emphasis You Will See

Emphasis is on protection, maintenance, and/or restoration of quality aquatic habitats, watershed conditions, and terrestrial habitats. This prescription can include areas where resource and habitat values are not at desired conditions and need to be actively restored. It also can include areas where these values are at desired conditions and need to be conserved. Other uses and activities are allowed provided they can be conducted within the standards and guidelines. Grazing by livestock is allowed as managed to meet standards and guidelines which support desired hydrologic, aquatic, and terrestrial conditions.

The importance of these areas is for meeting mid to long-term watershed and habitat objectives, with the strategy of taking a low to moderate risk approach to managing for biodiverrsity and population viability this planning period (10-15 years). The tools associated with this prescription are of moderate intensity and can provide for improvement of existing conditions through natural processes and moderate management activities. Management activities are designed to pose low risk of sediment delivery and low risk of adversely affecting the hydrologic regime, riparian areas, and important terrestrial habitat.

3.1 - Aquatic Habitat(3.1A)/Watershed (3.1W)Emphasis: Emphasis is on maintaining or improving quality of watershed conditions and aquatic habitats. The watershed function and aquatic habitat values are recognized as important and may require restoration to reach desired conditions. Areas of municipal watershed and public drinking water sources will be managed to maintain or improve soil processes and watershed conditions. Where improvement is needed, it is achieved by implementing watershed improvement projects, and by applying soil and water conservation practices to land-disturbing activities. Improve or maintain these lands to meet desired conditions of habitat for species at risk.

3.1A consists of the stream and adjacent riparian areas. Allowance for timber harvest , vegetation/fuels treatments, prescribed fire, road construction, wildland fire use, new recreation development, and new trail construction varies by alternative in the FEIS. Livestock grazing is allowed with the utilization standard for Riparian Class 1.

3.1W consists of uplands identified as important watersheds. Allowance for timber harvest , vegetation/fuels treatments, prescribed fire, road construction, wildland fire use, new recreation development, and new trail construction varies by alternative in the FEIS. Livestock grazing is allowed in open allotments.

3.2 Terrestrial Habitat Emphasis: (U- Undeveloped, D- Development allowed) Manage upland habitats to provide for sustaining and/or recovering plant and animal species and/or communities. Improve or maintain lands to meet desired conditions of habitat for threatened, endangered, and sensitive species. Considerations for these areas include corridors for seasonal migrations as well as movement of genetic materials, individuals, and populations; vegetation composition, structure, and pattern needed for all life cycle stages; control or eradication of undesirable non-native species; and protection of special habitats.

3.2U consists of those terrestrial habitat areas where development including timber harvest, road construction, new recreation developments, new trail construction, is not allowed because of potential impacts to key habitat elements. Vegetation/fuels treatments, prescribed and wildland fire use are allowed to maintain or restore habitat elements. Grazing of livestock is allowed.

3.2D consists of those terrestrial habitat areas where timber harvest and road construction as well as vegetation/fuels treatments, and prescribed and wildland fire use are allowed to maintain or restore habitat. Roads may be temporary based on site-specific analysis. Allowance for new recreation development and new trail construction varies by alternative in the FEIS. Livestock grazing is allowed.

4.0 – Multiple Resource Uses with Receration Needs and Opportunities

Theme

This prescription includes lands managed with special consideration for dispersed and developed recreation. Recreation needs and opportunities are emphasized is these areas. A wide spectrum of recreational settings may be provided. Facilities are constructed and maintained, and areas for **non-winter** motorized and non-motorized recreation opportunities are designated. Winter Recreation Allocations are displayed on separate maps. For snowmobiling, heli-skiing and non-motorized winter opportunities, see these maps. Landscape elements may be altered by human activities and developments. Recreation as well as other uses, are managed to ensure maintenance of watershed functions including water quality. The prescription subcategories (4.1-4.5) are based primarily on differences in recreation activities and settings. These include 1) access, 2) remoteness, 3) naturalness, 4) level of facilities and site management, 5) social encounters, and 6) visitor impacts and management.

Although the theme for management prescription category 4 is recreation settings and opportunities, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, provide the limits or constraints to guide this coordinated management. As long as other allowed (see Table of Generally Allowed Activities in each Alternative) resource activities, such as livestock grazing, fire use, or road construction meet the direction in the standards and guidelines, then they are consistent with the recreation prescription category.

Frequently used terms include the following:
Dispersed recreation is recreation activities that occur outside developed sites (such as campgrounds) within general forest areas such as hiking, horseback riding, ATV riding, or camping (outside developed campgrounds). ADA stands for the Americans with Disabilities Act and refers to facilities that accommodate people with disabilities, primarily wheelchair accessible sites and facilities. Management techniques refers to those tools and techniques the Forest Service can use to direct or manage people, such as defining and hardening (altering vegetation and access into) sites, putting up physical barriers such as large boulders to prevent undesired parking, or issuing area closures or implementing a permit system in a certain area.

Areas not mapped with 4. Prescriptions have recreation management guidance from the Recreation Opportunity Spectrum (ROS) allocation map which includes Classes that describe physical setting and activities range along a scale from a natural evolving environment and high degree of solitude to most evidence of humans and most social interactions. The classes in the Spectrum are: Wilderness/Primitive, Wilderness/Semi-Primitive Non-Motorized (Mapped as Wilderness and/or Proposed Wilderness), Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban.

Management Emphasis You Will See

4.1 Emphasis on Backcountry Non-motorized Settings: These areas provide recreation opportunities in remote and isolated settings where visitors can obtain a high degree of solitude and the environment is in a near-natural state. Access within these areas is through the use of non-motorized trails. Sights and sounds of others are minimal. Visitors will largely be managed off-site, with signs and regulations posted at area boundaries. Recreation site development is limited to those of a semi-primitive nature with regulation of use a priority management tool over site-hardening. The need for visitor self-reliance is high. Management visibility is low with backcountry ranger patrols focusing on monitoring and maintaining natural conditions and processes. ADA level development is not accommodated.

Livestock grazing and wildland fire use are allowed. Timber harvest, road construction, and new recreation development are not allowed. Allowance for vegetation/fuels treatments, prescribed fire, and new trail constuction varies by alternative in the FEIS. Where vegetation/fuels treatments and prescribed fire are allowed, the purpose is to mimic historic conditions and to restore ecosystem functioning.

4.2 Emphasis on Dispersed Non-motorized Settings: These areas provide recreation opportunities in a semi-primitive to modified setting where visitors can obtain various degrees of solitude within a near-natural environment. Access to the perimeter of these areas may be motorized, but travel within the area is non-motorized. Sights and sounds of others may be noticeable. Visitors can expect various levels of regulation. Signs and other information are found both at portals and within the prescription area. Recreation site development is less limited than in backcountry and can range from semi-primitive to rural depending on management objectives at specific areas and visitors' desires for convenience. Impacts to natural resources, such as soil compaction or loss of vegetation are dealt with through various management techniques and regulations. Some development accommodating ADA standards may be appropriate.

Livestock grazing and wildland fire use are allowed. Timber harvest and road construction are not allowed. Allowance for vegetation/fuels treatments, prescribed fire, new recreation development and new trail construction varies by alternative in the FEIS. Where vegetation/fuels treatments and prescribed fire are allowed, the purpose is to mimic historic conditions and to restore ecosystem functioning.

4.3 Emphasis on Backcountry Motorized Settings: These areas provide recreation opportunities in a more remote and isolated setting where visitors can obtain a higher degree of

solitude and the environment is in a near-natural setting. Access to and within these areas is primarily through the use of motorized trails and roads. Sights of other visitors are low and sounds of other users are low to moderate. Visitors are largely managed off-site, with signs and regulations posted at area boundaries. Site development is of a semi-primitive nature with regulation of use a priority management tool over site modification. Visitor self-reliance is high. Management visibility is low with backcountry ranger patrols focusing on monitoring and maintaining natural conditions and processes. ADA level development is not accommodated.

Livestock grazing and wildland fire use are allowed. Allowance for timber harvest, vegetation/fuels treatments, prescribed fire, road construction, new recreation development, and new trail construction varies by alternative in the FEIS. Where these activities are allowed they must be compatible with the backcountry recreation opportunity and natural setting desired.

4.4 Emphasis on Dispersed Motorized Settings: These areas provide recreation opportunities within a range of semi-primitive to rural settings. Visitors may be able to obtain a moderate degree of solitude, but this prescription area provides opportunities for increased social interaction. Access to and within these areas is primarily through the use of motorized trails and roads. Sights and sounds of others may be noticeable throughout the area. Recreation site developments range from semi-primitive to rural depending on management objectives at specific areas and visitor desires for convenience. Impacts to natural resources are dealt with through various management techniques and regulations. Some development to ADA standards may be appropriate.

Livestock grazing and wildland fire use are allowed. Allowance for timber harvest, vegetation/fuels treatments, prescribed fire, road construction, new recreation development, and new trail construction varies by alternative in the FEIS. Where these are allowed they must not detract from the recreation setting. They should be designed to facilitate the motorized recreation opportunity desired if possible.

4.5 Developed Recreation Areas: These areas include developed facilities such as campgrounds, trailheads, boat docks, and resorts as well as adjacent areas associated with these sites. High levels of visitor interaction can be expected where sights and sounds of others are noticeable and there are moderate to high opportunities for social interaction. Access to these areas is primarily by motorized roads. Visitors can expect higher levels of regulation. Signs and visitor information are noticeable throughout the area. Site development tends toward the Roaded Natural to Rural end of the Recreation Opportunity Spectrum (ROS). Facilities vary from rustic using native materials to facilities designed primarily for visitor comfort or convenience and built using synthetic materials. Visitor impacts are noticeable. Impacts to natural resources are dealt with through various management techniques and regulations. ADA level development is encouraged. Because of the large capitol investments in these areas, site protection is paramount.

Livestock grazing, timber harvest, and wildland fire use are not allowed. Allowance for vegetation/fuels treatments, prescribed fire, road construction, new recreation development, and new trail construction varies by alternative in the FEIS. Activities allowed are limited to those that provide public enjoyment, safety and protection of site investments.

5.0 - Multiple Resource Uses with Forestland Vegetation Management Needs and Opportunities

Theme

This prescription includes lands that are predominantly forested. Emphasis is on maintaining and restoring forest ecosystem functioning to achieve sustainable resource conditions, while providing favorable conditions for commodity and non-commodity outputs and services.

Although the theme for management prescription category 5 is forestland vegetation, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, provide the limits or constraints to guide this coordinated management. As long as other allowed (see Table of Allowed Activities in each alternative) resource activities, such as recreation, livestock grazing, aquatic habitat restoration or road construction, meet the direction in the standards and guidelines, then they are consistent with the forestland prescription category.

Frequently used terms include the following:
Sustainability is the ability to maintain a desired condition or flow of benefits over time. The ecosystem management principle of sustainability implies our ability to define and measure where ecosystems are now as compared to their historic range of variability. The concept of "historic range" recognizes that ecosystems are dynamic in nature and that disturbance and change is a common component. Areas that are within their historic range of variability are said to be in proper functioning condition.

Management Emphasis You Will See

5.1 Emphasis on maintaining or restoring forested ecosystem integrity while meeting multiple resource objectives.
Emphasis is on properly functioning conditions. Livestock grazing and wildland fire use are allowed. Allowance for timber harvest, vegetation/fuels treatments, prescribed fire, road construction, new recreation developments and new trail construction varies by alternative in the FEIS. Emphasis is not on timber growth and yield. Instead it is on maintaining or restoring vegetation composition, structure and patterns within the historic range of variability.

5.2 Emphasis on managing timber for growth and yield while maintaining or restoring forested ecosystem integrity.
Emphasis is on timber growth and yield. Forested landscapes range in appearance from near natural to altered where management activities are evident. Goods and services are provided within the productive capacity of the land, and ecological functions are maintained. The quantity of goods and services produced may or may not fully meet demand. Amenity values are provided for by management area direction.

Timber harvest and road construction are allowed. Allowance for prescribed and wildland fire use varies by alternative in the FEIS. Investments made in these areas for timber production, such as road systems and silvicultural improvements, and the value of the timber for wood production receive consideration prior to the use of fire. Roads are compatible with timber growth and yield management objectives. Livestock grazing is allowed but considers the need for timber regeneration and is compatible with timber management objectives. Allowance for new recreation development and new trail construction varies by alternative in the FEIS. Where allowed, these may be limited to the degree they are compatible with commercial timber production. In other words, timber harvest in these areas will not be restricted because of recreation development or trail construction.

6.0 - Multiple Resource Uses with Rangeland Vegetation Management Needs and Opportunities

Theme

This prescription includes lands that are predominantly non-forested. Management focuses on non-forest vegetation composition, structure, and pattern to achieve properly functioning conditions while providing sustainable commodity and non-commodity outputs, values and services.

Although the theme for management prescription category 6 is rangeland vegetation, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. The Forest-wide standards and guidelines, as well as any management direction developed specifically for this prescription category, provide the limits or constraints to guide this coordinated management. As long as other allowed (see table of Allowed Activities in each Alternative) resource activities such as recreation, fire use, aquatic habitat restoration or road construction, meet the direction in the standards and guidelines, then they are consistent with the rangeland prescription category**.**

Management Emphasis You Will See

6.1 Emphasis on maintaining or restoring non-forested ecosystem integrity while meeting multiple resource objectives.
Emphasis is on non-forested vegetation properly functioning conditions (i.e. vegetation composition, structure and patterns within the historic range of variability). Management encompasses the full range of land and resource treatment activities. Allowance for timber harvest, prescribed fire, road construction, new recreation development and new trail construction varies by alternative in the FEIS. Vegetation/fuels treatments, wildland fire use, and grazing are allowed. Forage production for livestock use is managed to also meet desired conditions for wildlife, riparian, water quality, or other objectives.

6.2 Emphasis on managing for livestock forage production while maintaining or restoring non-forested ecosystem integrity.
Emphasis is on managing vegetation composition and structure to produce forage for livestock. Livestock use is managed to ensure that rangelands are in satisfactory condition and/or with an upward trend. Goods and services are provided within the productive capacity of the land, and ecological functions are maintained. Non-forested landscapes range in appearance from near natural to altered where management activities are evident. The quantity of goods and services produced may or may not fully meet demand. Amenity values are provided for by management area direction. Allowance for timber harvest, prescribed fire, road building and new recreation development varies by alternative. Allowance for timber harvest, prescribed fire, road construction, new recreation development and new trail construction varies by alternative in the FEIS. Vegetation/fuels treatments, wildland fire use, and grazing are allowed. Where allowed, new recreation development and trail construction may be limited to the degree it is compatible with livestock grazing. In other words, livestock grazing will not be restricted because of recreation development.

7.0 – Intermingled Public/Private Lands

Theme

This prescription addressed National Forest System lands that are intermingled with lands owned or managed by others. Prescription Categories 7.1 and 7.2 (Intermingled Public/Private Lands, Rural or Urban) that were originally used in conjunction with other prescription numbers **have been removed from the maps**. The purpose of these prescriptions was to highlight the special need for coordinated land management with private landowners. However, the extra numbers made the maps difficult to read and since private lands are shown in gray on the maps this purpose can be met without the 7.1 and 7.2 prescriptions. Management emphasis is to cooperate with adjacent landowners in managing for diverse interests.

Management Emphasis You Will See

Areas with intermingled private lands (shown in gray on Maps) in an urban or town interface will be managed with the following considerations: Emphasis is on protecting natural ecosystem components from degradation while allowing for high levels of day use. Trespass for extractive or construction activities will not be allowed. Access for recreation to the National Forest System lands will be kept open, and specific public access points will be identified to assure access as well as to limit resource degradation. Motorized recreation may be limited to the extent necessary to be compatible with adjacent owners' needs and management area objectives. Fire use is allowed only if adjacent private property will be protected from fire.

Areas with intermingled private lands (shown in gray on Maps) in a rural interface will be managed with the following considerations: Emphasis is on protecting natural ecosystem components from degradation while allowing for moderate use. Trespass for extractive or construction activities will not be allowed. Access for recreation to the National Forest System lands will be kept open, and specific public access points will be identified to assure access as well as to limit resource degradation. Any grazing or timber activities will be carefully

coordinated with adjacent owners. Motorized recreation may be limited to the extent necessary to be compatible with adjacent owners' needs and management area objectives. Fire use is allowed only if adjacent private property will be protected from fire.

8.0 – Concentrated Development Areas

Theme

This prescription includes lands managed for concentrated development and use within a multiple use context.

Management Emphasis You Will See

Uses and facility development dominate the landscape and often require extensive site alterations. Emphasis is on maintaining or restoring the existing facilities and uses.

8.1 Features may include oil and gas production sites or other mineral development sites for common variety (saleable) minerals. Allowance for timber harvest, vegetation and fuels treatments, prescribed fire, new recreation development and new trail construction varies by alternative in the FEIS. Wildland fire use is not allowed. Road construction and grazing are allowed.

APPENDIX D - 2

Forestwide Management Direction - Recreation Opportunity Spectrum - (ROS) Summer

Introduction

The Forest Service has used ROS since the 1980's as a management tool to describe and map outdoor recreation settings. (See (Forest Service, ROS Book, 1986). ROS is one of four mapped management direction tools used in this FEIS, the others being Management Prescription Categories (MPC), Winter Recreation, and Scenery Management System (SMS). The ROS system provides a way to help managers and recreation users understand what recreation experiences to expect and where these are available across the forest. ROS can help people visualize the variety of natural outdoor settings, the types of activities that can be pursued, and how many other people might be found in an area of the forest. The system is applied in combination with other management direction such as desired future conditions, standards, guidelines, goals, and objectives to define expectations about management of a particular area of the forest.

ROS Application and Relationship to Travel Planning and Management

This section addresses how ROS mapping is to be used when Travel Management Plans are updated. A mapped ROS Class such as Semi-Primitive Non-Motorized is not intended to preclude consideration of additional motorized routes in that area, for example to develop a loop between existing motorized routes. Likewise, an area mapped as Semi-Primitive Motorized because of an existing motorized trail is not intended to be precluded from consideration for closure and return to non-motorized status. ROS Maps provide direction for managing recreation settings *until such time that Travel Management Plans are updated through site-specific analysis*. As Travel Plans are updated, that analysis can include alternatives that will require amendment of the Forest Plan ROS Maps. In other words, *ROS Mapping necessarily follows Travel Management Plan updates*, rather than precluding certain changes to them. This ensures that a range of options can be considered at the site-specific level, which is the appropriate scale for decision-making on designated open travel routes. This is an expected and appropriate type of adaptation of the Plan to changes in the future.

Finally, it is important to recognize that the ROS maps are NOT Travel Management Maps and do not show which routes are designated as open to motorized uses. A ROS Class of motorized on the map may be the result of motorized routes nearby but off National Forest that influence the recreation setting on National Forest. A good example of this is in some areas of the Wasatch Front foothills where roads off Forest create sights and sounds that cause the adjacent Forest to be mapped as semi-primitive motorized even though there are no motorized routes within them on National Forest.

Recreation Opportunity Class Descriptions

Table D2-1 provides a description of each of the seven ROS classes applied to the Wasatch-Cache National Forest. These classes were applied using rules established in the ROS manual (listed above) in conjunction with minor adjustments for local conditions. It is important to recognize that these maps are NOT Travel Management Maps and do not show which routes are designated as open to motorized uses. A ROS Class of motorized may be the result of motorized routes nearby but off National Forest and influencing the recreation setting on National Forest. ROS (summer) maps of alternatives can be found in the Map Packets.

Table D2-1. Classes, Settings and Opportunity Descriptions

ROS CLASS	DESCRIPTION	
	Setting	**Characteristics**
Wilderness/Primitive	**Physical**	**Theme:** Remote (3 miles from motorized use), predominately unmodified, naturally evolving landscape character **Location:** MPC 1.1, High Uintas Wilderness **Infrastructure:** *Access* – non-motorized trails are present *Fishing Sites* – rivers and lakes *Camp/Picnic Sites* – not developed or defined, leave no trace *Sanitation* – no facilities, leave no trace *Water Supply* – undeveloped natural *Signing* – minimal, constructed of rustic natural materials *Interpretation* – through self discovery and at trailheads *Water Crossing* – minimal, some bridges made of natural (non-dimensional) materials may exist, but are rare **Vegetation:** Natural, no treatments except for fire use
Wilderness/Primitive	**Managerial**	Few signs, few encounters with rangers, travel on foot and horse, no motorized or mechanized travel allowed
	Social	**Local adjustment:** High Uintas Wilderness may have the sights and sounds of commercial flight routes near by or directly over the Wilderness **Off Trail System:** Very Low encounters with other parties **Trials:** Low encounters with other parties **Camp Spacing:** Should not be closer than one mile apart **Opportunities:** Closeness to nature; self-reliance, moderately-high to high challenge and risk; little evidence of people off of trails

ROS CLASS	DESCRIPTION	
	Setting	Characteristics
Wilderness/Semi-Primitive Non-Motorized	Physical	**Theme:** Remote (less than 3 miles from motorized use), predominately unmodified, naturally evolving landscape character **Location:** MPC 1.2 & 1.3, High Uintas MPC 1.1 - 1.3, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak, Mount Naomi and Wellsville Mountain Wildernesses **Infrastructure:** *Access* – non-motorized trails are present *Fishing Sites* – rivers and lakes *Camp/Picnic Sites* – not developed or defined, leave no trace *Sanitation* – no facilities, leave no trace *Water Supply* – undeveloped natural *Signing* – minimal, constructed of rustic natural materials *Interpretation* – through self discovery and at trailheads *Water Crossing* – minimal, some bridges made of natural (non-dimensional) materials may exist, but are rare **Vegetation:** Natural, no treatments except for fire use
	Managerial	Few signs, few encounters with rangers, travel on foot and horse, no motorized or mechanized travel allowed
	Social	**Off Trail System:** MPC 1.1 in Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak, Mount Naomi, and Wellsville Mountain Wildernesses Low encounters with other parties **Trails:** MPC 1.1 in Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak, Mount Naomi, and Wellsville Wildernesses –Low encounters with other parties MPC 1.2, 1.3 in High Uintas, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak, Mount Naomi and Wellsville Mountain Wildernesses –Low encounters with other parties **Local Adjustment:** High Uintas, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak and Mount Naomi, and Wellsville Wildernesses all have the sights and

ROS CLASS	DESCRIPTION	
	Setting	Characteristics
Wilderness/Semi-Primitive Non-Motorized	Social	Sounds of commercial flight routes near by or directly over the wilderness **Local Adjustment:** Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak Mt. Naomi, and Wellsville Wildernesses are adjacent to population centers and the sights and sounds of these communities could be evident **Local Adjustment for Weekends and Holidays Trails:** High Uintas, Mount Naomi, Wellsville Mountain and Deseret Peak Wildernesses – MPC 1.2 – Moderately Low encounters with other parties **Local Adjustment for Weekends and Holidays Trails:** Mt. Olympus, Twin Peaks, and Lone Peak Wildernesses – MPC 1.2 – Moderate encounters with other parties **Local Adjustment for Weekends and Holidays Trails:** High Uintas, Mount Naomi, Wellsville Mountain, and Deseret Peak Wildernesses – MPC 1.3 – Moderate encounters with other parties **Local Adjustment for Weekends and Holidays Trails:** Mt. Olympus, Twin Peaks, and Lone Peak Wildernesses – MPC 1.3 – High encounters with other parties (reason for high encounters is because access to a desired destination is on a cherry stem trail) **Camp Spacing:** MPC 1.2 - 1.3, High Uintas – Campsites should be no closer than ¼ mile apart MPC 1.1, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak and Mount Naomi Wildernesses – Campsites should be no closer than ½ mile apart MPC 1.2, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak and Mount Naomi Wildernesses – Campsites should be no closer than ¼ mile apart MPC 1.3, Mt. Olympus, Twin Peaks, Lone Peak, Deseret Peak and Mount Naomi Wildernesses – Campsites should be no closer than 100 feet apart **Opportunities:** Closeness to nature; self-reliance, high challenge and risk; little evidence of people off of trails

ROS CLASS	DESCRIPTION	
	Setting	Characteristics
Semi-Primitive Non-Motorized	Physical	**Theme:** Predominately a natural evolving /natural appearing landscape character with minimal rustic improvements to protect resources **Infrastructure:** *Access* – non-motorized trails are present closed and temporary roads may be present *Fishing Sites* – rivers, lakes, and reservoirs *Camp/Picnic Sites* – not developed, leave no trace *Sanitation* – no facilities, leave no trace *Water Supply* – undeveloped natural *Signing* – rustic constructed of natural materials *Interpretation* – through self discovery, at trailheads
Semi-Primitive Non-Motorized	Physical	*Water Crossing* – rustic structures or bridges made of natural materials **Vegetation:** Predominately natural, treatment areas exist to enhance forest health but are few and widely dispersed.
	Managerial	Minimum or subtle signing and regulations, some encounters with rangers, motorized travel prohibited
	Social	**Off Trail System:** Low encounter with other parties **Trails:** Low to Moderate encounters with other parties **Local Adjustment:** Some areas are adjacent to population centers and the sights and sounds of these communities could be evident **Local Adjustments for Weekends and Holidays Trails:** Check with local Ranger Districts for information on trails with High encounters with other parties **Camp Spacing:** Usually less than 6 parties visible from a campsite **Opportunities:** Closeness to nature, self-reliance high to moderate challenge and risk, some evidence of others

ROS CLASS	DESCRIPTION	
	Setting	Characteristics
Semi-Primitive Motorized	Physical	**Theme:** Predominately a natural appearing landscape character with minimal improvements to protect resources **Infrastructure:** *Access* – motorized trails and primitive raods (maintenance level 2 roads) *Fishing Sites* – rivers, lakes, and reservoirs with some trails and primitive roads *Camp/Picnic Sites* – not developed, leave no trace, some identified concentrated use areas *Sanitation* – limited facilities, rustic, may have rustic outhouse available *Water Supply* – undeveloped natural, rustic developments *Signing* – rustic, made of natural materials *Interpretation* – self discovery, some located on site or at trailheads *Water Crossing* – rustic structures or bridges made of natural material, some designed for motorized use **Vegetation:** Treatment areas are very small in number, widely disbursed, and consistent with natural vegetation patterns.
	Managerial	Minimum or subtle on-site controls with some restrictions, motorized and mechanized travel restricted to designated travel routes, no motorized or mechanized travel allowed off designated travel routes
	Social	**Motorized Travel Ways:** Low to moderate contact frequency on loop travel ways, moderate contact frequency on cherry stem travel ways **Local adjustment for Weekends and Holidays:** Check with local Ranger Districts for information on travel ways with High encounters with other parties **Concentrated Use Sites:** Low to moderate group and family interaction **Opportunities:** Closeness to nature, high degree of challenge and risk using motorized equipment, evidence of motorized equipment on trails and primitive roads, and by audible motor sounds

ROS CLASS	DESCRIPTION	
	Setting	**Characteristics**
Roaded Natural	**Physical**	**Theme:** Predominately a natural appearing and developed natural appearing landscape character with nodes and corridors of development such as campgrounds, trailheads, boat launches, small-scale resorts, and recreation residences **Infrastructure:** *Access* – Roads (typically maintenance levels 3-5) and motorized and non-motorized trails *Fishing Sites* – rivers, lakes, reservoirs with some facilities *Camp/Picnic Sites* – concentrated use areas and developed sites *Sanitation* – developed outhouses that blend with natural setting *Water Supply* – often developed *Signing* – Rustic with natural materials to more refined using a variety of materials such as fiberglass, metal, etc. *Interpretation* – simple roadside signs, some interpretive programs *Water Crossing* – bridges generally constructed of natural materials **Vegetation:** Changes (treatments) to the natural vegetation patterns are evident, but in harmony with natural environment
	Managerial	Opportunity to be with other users in developed sites, some obvious signs (information and regulation) and low to moderate likelihood of meeting Forest Service Rangers, motorized and mechanized travel restricted to designated routes, no motorized or mechanized travel allowed off designated travel routes
	Social	**Developed and Concentrated Use Areas:** Moderate evidence of human sights and sounds **Travel Ways:** Moderate to high sites and sounds of humans **Opportunities:** Moderate concentration of users at campsites, little challenge or risk
Rural	**Physical**	**Theme:** Predominately a altered landscapes of developed natural appearing, resort natural setting and water recreation rural appearing with natural appearing backdrops, ski resorts, campgrounds, interpretive sites, marinas, boat launch, swimming beaches, trailheads and reservoirs **Infrastructure:** *Access* – roads (typically level 4 and 5) and trails are hardened *Fishing Sites* – some facility development *Camp/Picnic Sites* – designed for user comfort, natural to synthetic materials that blend with the natural environment, may have hookup amenities such as hot water, electricity, and sewage disposal sites *Sanitation* – developed, design for user comfort

ROS CLASS	DESCRIPTION	
	Setting	**Characteristics**
Rural	**Physical**	*Water Supply* – developed, designed for user convenience *Signing* – rustic to highly designed that harmonizes with the landscape character *Interpretation* – complex roadside signs, some staffed facilities, visitor centers, and interpretive programs *Water Crossing* – bridges of varying size that are in harmony with the landscape **Vegetation:** Treatment areas often dominate, but blend with natural appearing landscape by utilizing lines , forms, colors, and textures of the surrounding natural landscape
	Managerial	Obvious signing (regulation and information), education and law enforcement staff available, motorized and mechanized travel restricted to designated routes, no motorized or mechanized travel allowed off designated travel routes
	Social	**Developed Use Areas and Travel Ways:** High interaction among users is common **Opportunities:** Little challenge or risk associated with being in the outdoors
Urban	**Physical**	**Theme:** Predominately, heavy site modifications and facilities of resort natural setting and water recreation rural appearing with natural appearing backdrops; highly developed ski areas and resorts are examples of urban nodes within the National Forest system lands **Infrastructure:** *Access* – travel routes highly developed (typically levels 4 and 5) for motorized use often with mass transit supplements available; trails are constructed for ease of movement; majority of routes are concrete, paved, or graveled *Camp/Picnic Sites* – developed and designed for user comfort, variety of construction materials used, campsites in close proximity to each other, nearby cafés and restaurants *Sanitation* – developed and designed for user comfort, most have running water *Water Supply* – developed and designed for user comfort, many have hot water available *Signing* – natural and synthetic materials appropriate *Interpretation* – exhibits in staffed visitor centers, roadside exhibits, etc. *Water Crossing* – bridges constructed of a variety of materials, design for user convenience and safety **Vegetation:** Often planted, manicured and maintained
	Managerial	Intensive on-site management obvious signs and staffing, education and law enforcement available; motorized and mechanized travel restricted to designated routes; no motorized or mechanized travel allowed off designated travel routes

ROS CLASS	DESCRIPTION	
	Setting	Characteristics
	Social	**Developed Areas:** Opportunity to be with others; high degree of interaction with people
Urban	Social	**Opportunities: Challenge and risk are unimportant except for competitive sports**

APPENDIX D-3

Forestwide Management Direction -– Winter Recreation Opportunities

Introduction

The Wasatch-Cache National Forest is using Winter Recreation Classes as a management tool to describe and allocate outdoor winter recreation areas and routes. Winter Recreation (WR) is one of four management direction elements used in this FEIS, the others being Management Prescription Categories (MPC), Recreation Opportunity Spectrum (ROS) and Scenery Management System (SMS). The WR system provides a way to help managers and recreation users understand where winter motorized recreation is allowed; which areas allow Heli-skiing; and where winter motorized uses are not allowed. These Winter Recreation Classes and Maps replace the winter portion of District Travel Management Plans. The system is applied in combination with other management direction such as desired future conditions, standards, guidelines, goals, and objectives to define expectations about management of a particular area of the forest.

The classes below provide a description of each of the four WR classes applied to the Wasatch-Cache National Forest. These classes were applied using criteria established in Appendix B WR Process. WR maps of the classes for each of the alternatives can be found in the Map Packets.

Winter Recreation Classes

Winter Recreation maps answer three basic questions:

1. "Where can I snowmobile?"
2. "Where is helicopter skiing allowed?"
3. "Where is winter motorized use not allowed?"

The Winter Recreation Class applies when there is an adequate depth of snow present on the ground to protect vegetative resources. When there is an inadequate depth of snow present, summer ROS maps as well as Travel Management Plans apply and use of snowmobiles is not permitted off of designated routes.

Four classes are mapped for Winter Recreation:

1) **Wilderness**—these areas show designated wilderness and recommended Wilderness. Snowmobiling, heli-skiing, or other motorized use is not allowed.

2) **Non-motorized Areas** – These areas emphasize non-motorized winter recreation such as x-country skiing, snowshoeing, tubing, etc., no snowmobiles or other motorized uses are allowed.

3) **Motorized –** Snowmobiling is permitted in these areas and/or on designated routes. Non-motorized uses are also permitted here.

4) **Heli-skiing –** These areas are designated for heli-skiing (helicopter supported backcountry skiing), generally, there is no snowmobiling allowed in these areas unless otherwise noted. Other non-motorized uses are permitted.

APPENDIX E

Vertebrate Wildlife Species of the Wasatch-Cache National Forest

The following list was compiled after reviewing the species list from the 1985 Forest Plan along with lists from the other Forests in Northern Utah. The list contains species known to exist on the Wasatch-Cache National Forest or species whose range includes the Forest and habitat is present. Species at Risk (as defined in the glossary) are marked with an asterisk (*). Plant species at risk are listed in Appendix F.

Fish

Mountain Whitefish	*Prosopium williamsoni*
Kokanee	*Oncorhynchus nerka*
Golden Trout	*Oncorhynchus aguabonita*
Bonneville Cutthroat Trout*	*Oncorhynchus clarki utah*
Colorado Cutthroat Trout*	*Oncorhynchus clarki pleuriticus*
Yellowstone Cutthroat Trout	*Oncorhynchus clarki bouvieri*
Rainbow Trout	*Oncorhynchus mykiss*
Brown Trout	*Salmo trutta*
Brook Trout	*Salvelinus fontinalis*
Lake Trout	*Salvelinus namaycush*
Arctic Grayling	*Thymallus arcticus*
Carp	*Cyprinus carpio*
Utah Chub	*Gila atraria*
Longnose Dace	*Rhinichthys cataractae*
Speckled Dace	*Rhinichthys osulus*
Redside Shiner	*Richardsonius balteatus*
Utah Sucker	*Catostomus ardens*
Bluehead Sucker	*Catostomus discobolus*
Mountain Sucker	*Catostomus platyrhynchus*
Black Bullhead	*Ameiurus melas*
Green Sunfish	*Lepomis cyanellus*
Channel Catfish	*Ictalurus punctatus*
Bluegill	*Lepomis macrochirus*
Smallmouth Bass	*Micropterus dolomieu*
Largemouth Bass	*Micropterus salmoides*
Mottled Sculpin	*Cottus bairdi*
Black Crappie	*Pomoxis nigromaculatus*
Tiger Muskie	*Esox masquinongy*
Yellow Perch	*Perca flavescens*
June Sucker	*Chasmistes liorus mictus*
Paiute Sculpin	*Cottus beldingi*

Reptiles and Amphibians

Western Collared Lizard	*Crotaphytus collaris baileyi*
Short-horned Lizard	*Phrynosoma douglassii*
Tree Lizard	*Urosaurus ornatus*
Side-blotched Lizard	*Uta stansburiana*
Great Basin Skink	*Eumeces skiltonianus utahensis*
Great Basin Whiptail	*Cnemidophorus tigris tigris*
Utah Milk Snake*	*Lampropeltis triangulum taylori*
Rubber Boa	*Charina bottae*
Western Yellow-bellied Racer	*Coluber constrictor mormon*
Ringnecked Snake	*Diadophis punctuatus regalis*
Night Snake	*Hypsiglena torquata*
Common Kingsnake	*Lampropeltis pyomelana infralabialis*
Striped Whipsnake	*Masticophis taeniatus*
Wandering Garter Snake	*Thamnophis elegans vagrans*
Smooth Green Snake	*Opheodrys vernalis*
Gopher Snake	*Pituophis melanoleucus deserticola*
Valley Garter Snake	*Thamnophis sirtalis fitchi*
Midget Faded Rattlesnake	*Crotalus viridis concolor*
Tiger Salamander	*Ambystoma tigrinum nebulosum*
Western Toad*	*Bufo boreas boreas*
Woodhouses Toad	*Bufo woodhousei woodhousei*
Boreal Chorus Frog	*Pseudacris triseriata maculata*
Leopard Frog	*Rana pipiens brachycephala*
Columbian Spotted Frog*	*Rana pretiosa*

Mammals

Dwarf Shrew*	*Sorex nanus*
Masked Shrew	*Sorex cinereus*
Northern Water Shrew	*Sorex palustris*
Vagrant Shrew	*Sorex vagrans*
Little Brown Myotis	*Myotis lucifugus*
Big Brown Bat	*Eptesicus fuscus*
Fringed Myotis*	*Myotis thysanodes*
Western Small-footed Myotis*	*Myotis cilolabrum* (Formerly *Myotis subulatus* and *M. Leibii.)*
Silver-haired Bat	*Lasionycteris nactivagans*
Hoary Bat	*Lasiurus cinereus*
Long-eared Myotis	*Myotis evotis*
Long-legged Myotis	*Myotis volans*
Townsned's Big-eared Bat*	*Plecotus townsendi*
Western Red Bat*	*Lasiurus blossevillii*
Black Bear	*Ursus Americanus*
Racoon	*Procyon lotor*
Ring-tailed Cat	*Bassariscus astutus*

American Pine Marten*	*Martes americana*
Striped Skunk	*Mephitis mephitis*
Shorttail Weasel	Mus*tela erminea*
Longtail Weasel	*Mustela frenata*
Mink	*Mustela vison*
Spotted Skunk	*Spilogale gracilis*
Wolverine*	*Gulo luscus*
Badger	*Taxidea taxus*
Coyote	*Canis latrans*
Red Fox	*Vulpes vulpes*
Kit Fox	*Vulpes macrotis*
Mountain Lion	*Felis concolor*
Canada Lynx*	*Lynx canidensis*
Bobcat	*Lynx rufus*
Cliff Chipmunk	*Eutamias dorsalis*
Least Chipmunk	*Eutamias minimus*
Uinta Chipmunk	*Eutamias umbrinus*
Northern Flying Squirrel	*Glaucomys sabrinus*
Yellowbelly Marmot	*Marmota flaviventris*
Whtetail Prairie Dog	*Cynomys gunnisoni*
Uinta Ground Squirrel	*Spermophilus armatus*
Golden-mantled Ground Squirrel	S*permophilus lateralis*
Rock Squirrel	*Spermaphilus variegatus*
Red Squirrel	*Tamiasciurus hudsonicus*
Idaho Pocket Gopher*	*Thomomys idahoensis*
Great Basin Pocket Mouse	*Perognathus parvus*
Beaver	*Castor canadensis*
Boreal Redback Vole	*Clethrionomys gapperi*
Sagebrush vole	*Lagurus curtatus*
Meadow Vole	*Microtus pennsylvanicus*
Longtail Vole	*Microtus longicaudus*
Mountain Vole	*Microtus montanus*
Richardson Vole	*Microtus richardsoni*
Desert Woodrat	*Neotoma lepida*
Bushytail Woodrat	*Neotoma cinerea*
Muskrat	*Ondatra zibethica*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Canyon Mouse	*Peromyscus crinitus*
Deer Mouse	*Peromyscus maniculatus*
Pinon Mouse	*Permyscus truei*
Western Harvest Mouse	*Reithrodontomys megalotis*
House Mouse	*Mus musculus*
Western Jumping Mouse	*Zapus princeps*
Porcupine	*Erethizon dorsatum*
Pika	*Ochotona princeps*
Snowshoe Hare	*Lepus americanus*
Blacktail Jackrabbit	*Lepus californicus*
Whitetail Jackrabbit	*Lepus townsendi*
Pygmy Rabbit	*Sylvilagus idahoensis*
Mountain Cottontail	*Sylvilagus nuttalli*

Moose	*Alces alces*
Elk	*Cervis canadensis*
Mule Deer	*Odocoileus hemionus*
Pronghorn	*Antilocapra americana*
Mountain Goat	*Oreamnos americanus*
Rocky Mountain Bighorn Sheep	*Ovis canadensis*
Humans	*Homo sapien*

Birds

Common Loon	*Gavia immer*
Western Grebe	*Aechmophorus occidentalis*
Eared Grebe	*Podiceps nigricollis*
White Pelican	*Pelecanus erythrorhynchos*
Black-crowned Night Heron	*Nycticorax nycticorax*
Snowy Egret	*Egretta thula*
Great Blue Heron	*Ardea herodias*
Sandhill Crane*	*Grus canadensis*
Canada Goose	*Branta canadensis*
Pintail	*Anas acuta*
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
Green-winged Teal	*Anas crecca*
Cinnamon Teal	*Anas cyanoptera*
Blue-winged Teal	*Anas discors*
American Wigeon	*Anas americana*
Northern Shoveler	*Anas clypeata*
Ruddy Duck	*Oxyura jamaicensis*
Wood Duck	*Aix sponsa*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Lesser Scaup	*Aythya affinis*
Common Goldeneye	*Bucephala clangula*
Barrow’s Goldeneye	*Bucephala clangula*
Buffelhead	*Bucephala albeola*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Sora	*Porzana carolina*
Amerian Coot	*Fulica americana*
Marbled Godwit	*Limosa fedoa*
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Common Snipe	*Gallinago gallinago*
Franklin’s Gull	*Larus pipixcan*
California Gull	*Larus califonicus*
Forster’s Tern	*Sterna forsteri*
Black Tern	*Childonias niger*
Turkey Vulture	*Cathartes aura*
Golden Eagle	*Aquila chrysaetos*

Bald Eagle*	*Haliaeetus laucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striayus*
Cooper's Hawk	*Accipiter cooperii*
Northern Goshawk*	*Accipiter gentillis*
Red-tailed Hawk	*Buteo jamaicensis*
Swainson's Hawk	*Buteo swainsoni*
Rough-legged Hawk	*Buteo lagopus*
Ferruginous Hawk	*Buteo regalis*
Osprey*	*Pandion haliaetus*
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Prairie Falcon	*Falco mexicanus*
Peregrine Falcon*	*Falco peregrinus*
Ruffed Grouse	*Bonasa umbellus*
Blue Grouse	*Dendragapus obscurus*
White-tailed Ptarmigan	*Lagopus leucurus*
Sage Grouse*	*Centrocercus urophasianus*
Columbian Sharp-tailed Grouse*	*Tynpanuchus phasianellus*
California Quail	*Callipepla californica*
Chukar	*Alectoris chukar*
Gray Partridge	*Perdix perdix*
Ring-necked Pheasant	*Phasianus colchicus*
Turkey	*Meleagris gallopavo*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Short-eared Owl	*Asio flammeus*
Long-eared Owl	*Asio otus*
Great Horned Owl	*Bubo virginianus*
Western Screech Owl	*Otus kennicottii*
Flammulated Owl*	*Otus flammeolus*
Northern Pygmy Owl	*Glaucidium gnoma*
Northern Saw-whet Owl	*Aegolius acadicus*
Boreal Owl*	*Aegolius funereus*
Burrowing Owl	*Athene cunicularia*
Common Poorwill	*Phalaenoptilus nuttallii*
Common Nighthawk	*Chordeiles minor*
Black Swift*	*Cypseloides niger*
White-throated Swift	*Aeronautes saxatalis*
Black-chinned Hummingbird	*Archilochus alexandri*
Calliope Hummingbird	*Stellula calliope*
Broad-tailed Hummingbird*	*Selasphorus platycercus*
Rufous hummingbird	*Selasphorus rufus*
Belted Kingfisher	*Ceryle alcyon*
Northern Flicker	*Colaptes auratus*
Lewis' Woodpecker*	*Melanerpes lewis*
Williamson's Sapsucker*	*Sphyrapicus thyroideus*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*

Northern 3-toed Woodpecker*	*Picoides tridactylus*
Eastern Kingbird	*Tyrannus tyrannus*
Western Kingbird	*Tyrannus verticalis*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Olive-sided Flycatcher	*Contopus orealis*
Western Wood Peewee	*Contopus sordidulus*
Say's Phoebe	*Sayornis saya*
Gray Flycatcher	*Empidonax wrightii*
Dusky Flycatcher	*Empidonax oberholseri*
Hammond's Flycatcher	*Empidonax hammondii*
Western Flycatcher	*Empidonax difficilis*
Horned Lark	*Eremophila alpestris*
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Purple Martin	*Progne subis*
Bank Swallow	*Riparia riparia*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Cliff Swallow	*Hirundo pyrrhonota*
Barn Swallow	*Hirundo rustica*
Scrub Jay	*Aphelocoma coerulescens*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Steller's Jay	*Cyanocitta stelleri*
Gray Jay	*Perisoreus canadensis*
Clark's Nutcracker	*Nucifraga columbiana*
Black-billed Magpie	*Pica pica*
Common Raven	*Corvus corax*
Plain Titmouse	*Parus inornatus*
Black-capped Chickadee	*Parus atricapillus*
Mountain Chickadee	*Parus gambeli*
Common Bushtit	*Psaltriparus minimus*
Brown Creeper	*Certhia americana*
White-breasted Nuthatch	*Sitta carolinensis*
Red-breasted Nuthatch	*Sitta canadensis*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Canyon Wren	*Catherpes mexicanus*
Rock Wren	*Salpinctes obsoletus*
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Mountain Bluebird	*Sialia currucoides*
Townsend's Solitaire	*Myadestes townsendi*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Loggerhead Shrike	*Lanius ludovicianus*
Gray Catbird*	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Sage Thrasher	*Oreoscoptes montanus*
American Pipit	*Anthus rubescens*

American Dipper	*Cinclus mexicanus*
Bohemian Waxwing	*Bombycilla garrulus*
Cedar Waxwing	*Bombycilla cedrorum*
European Starling	*Sturnus vulgaris*
Solitary Vireo	*Vireo solitarius*
Warbling Vireo	*Vireo gilvus*
Tennessee Warbler	*Vermivora peregrina*
Orange-crowned Warbler	*Vermivora celata*
Black-throated Blue Warbler	*Dendroica caerulescens*
Yellow-rumped Warbler	*Dendroica magnolia*
Black-throated Gray Warbler	*Dendroica nigrescens*
Townsend's Warbler	*Dendroica townsendi*
Virginia's Warbler*	*Vermivora virginiae*
Yellow Warbler	*Dendroica petechia*
MacGillivray's Warbler	*Oporornis tolmiei*
Connecticut Warbler	*Oporornis agilis*
Wilson's Warbler	*Wilsonia pusilla*
Ovenbird	*Seiurus aurocapillus*
Yellow-breasted Chat	*Icteria virens*
American Redstart*	*Setophaga ruticilla*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Lazuli Bunting	*Passerina amoena*
Green-tailed Towhee	*Pipiol chlorurus*
Rufous-sided Towhee	*Pipiol erythrophthalmus*
Vesper Sparrow	*Pooecetes gramineus*
Song Sparrow	*Melospiza melodia*
Lark Sparrow	*Chondestes grammacus*
Sage Sparrow	*Amphispiza belli*
Chipping Sparrow	*Spizella passerina*
Brewer's Sparrow*	*Spizella breweri*
Dark-eyed Junco	*Junco hyemalis caniceps*
White-crowned Sparrow	*Zonotrichis leucophrys*
Fox Sparrow	*Pesserella illiaca*
Lincoln's Sparrow	*Melospiza lincolnii*
Western Meadowlark	*Sturnella neglecta*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Red-winged Blackbird	*Agelaius phoeniceus*
Rusty Blackbird	*Euphagus carolinus*
Brown-headed Cowbird	*Molothrus ater*
Western Tanager	*Piranga ludoviciana udoviciana*
House Sparrow	*Passer domesticus*
Pine Siskin	*Carduelis pinus*
Lesser Goldfinch	*Carduelis psaltria*
Red Crossbill	*Loxia curvirostra*
White-winged Crossbill	*Loxia leucoptera*
Pine Grosbeak	*Pinicola enucleator*
Black Rosy Finch*	*Leucosticte arctoa*
Cassin's Finch	*Carpodacus cassinii*
House Finch	*Carpodacus mexicanus*
Evening Grosbeak*	*Coccothraustes vespertinus*

APPENDIX F

Botanical Resources

Introduction

This Appendix provides information used to evaluate potential risks and threats of alternatives in the FEIS as well as to assess the current situation with regard to Plant Species at Risk(SAR), which includes Threatened, Endangered, Proposed, Sensitive, Recommended Sensitive and Watch list species. Table F-1 is an outline of the habit, life form, habitat group, and plant status. Table F-2 is an outline rating the impacts from Management activities to SAR. Impacts from these activities directly affect plant populations. Table F-3 rates the effects of alterations of ecological factors that would impact the habitat for SAR. These are activities that would have an indirect affect on SAR. Table F-4 rates the factors with potential to reduce habitat for the SAR. These directly impact both the SAR populations and the habitat. Ratings are categorized in Low (1), Medium (2), and High (3). Table F-5 lists the references used in the analysis.

Table F-1. Habit, Lifeform, Habitat Group, and Plant Status (USFS and UCDC) of the SAR Plants that occur on the Wasatch-Cache National Forest

Species Name	Common Name	Habit	Lifeform	Habitat group	Plant Status
Abies concolor (Gord. & Glind.) Lindl.	White Fir	Perennial	Tree	Mountain Forest	Watch
Angelica wheeleri	Wheeler's angelica	Perennial	Herb	Riparian, Meadows/Seeps	Rec. Sensitive
Arabis glabra var. *furcatipilis*	Hopkin's tower-mustard	Biennial/ perennial	Herb	Riparian, Meadows/Seeps Woodlands	Rec. Sensitive
Arabis lasiocarpa	Wasatch rock-cress, Toiyabe rock-cress	Perennial	Herb	Mountain Forest, Woodland, Shrubland	Watch
Artemisia norvegica var. *piceetorum*	Spruce wormwood	Perennial	Herb	Mountain Forst, Alpine	Rec. Sensitive
Aster sibericus var. *meritus*	Siberian aster		Herb	Rock Cliffs/Crevices/ Talus/Scree, Alpine	Watch
Astragalus flexuosus var. *flexuosus*	Bent milkvetch	Perennial	Herb	Mountain Forest, Shrubland, Woodland	Watch
Astragalus jejunus var. *jejunus*	Starvling milkvetch	Perennial	Herb	Shrubland	Sensitive
Astragalus robbinsii	Robbins' milkvetch	Perennial	Herb	Shrubland, Woodland	Watch
Botrychium crenulatum	Dainty moonwort, crenualte moonwort	Perennial	Herb	Shrubland, Woodland	Watch
Botrychium lineare	Slender moonwort	Perennial	Herb	Riparian Meadows/Seeps	Proposed
Cirsium eatonii var. *murdockii*	Murdock's thistle	Perennial	Herb	Rock Cliffs/Crevices/ Talus/Scree	Watch
Corydalis caseana ssp. *brachycarpa*	Wasatch fitweed	Perennial	Herb	Woodland, Mountain Forest, Alpine, Riparian meadows/ Seeps	Rec. Sensitive
Cymopterus acaulis var. *parvus*	Small spring parsley	Perennial	Herb	Shrubland	Watch

Table F-1. Habit, Lifeform, Habitat Group, and Plant Status (USFS and UCDC) of the SAR Plants that occur on the Wasatch-Cache National Forest

Species Name	Common Name	Habit	Lifeform	Habitat group	Plant Status
Cymopterus lapidosus	Echo spring-parsley	Perennial	Herb	Shrubland	Rec. Sensitive
Cypripedium calceolus ssp *parviflorum*	Lady's slipper	Perennial	Herb	Riparian Meadows/Seeps	Rec. Sensitive
Cypripedium fasciculatum	clustered lady's slipper, brownie lady's slipper	Perennial	Herb	Mountain Forests	Sensitive
Dodecatheon dentatum var. *utahense*	Utah shooting star, Wasatch shooting star	Perennial	Herb	Riparian Meadows/Seeps	Rec. Sensitive
Draba brachystylis	Wasatch draba	Biennial/ Perennial	Herb	Mountain Forests, Rock Cliffs/ Crevices, Talus/Scree	Rec. Sensitive
Draba globosa (D. densifolia var. *apiculata)*	Rockcress draba	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree, Alpine	Sensitive
Draba maguirei sensu lato	Maguire's draba	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree, Subalpine, Alpine Mountain Forest	Sensitive
Draba maguirei var. *burkei*	Burke's draba	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree, Subalpine, Alpine	Sensitive
Epipactis gigantea	Giant Helleborine	Perennial	Herb	Riparian Meadows/ Seeps	Watch
Erigeron arenarioides	Wasatch daisy	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree	Rec. Sensitive
Erigeron cronquistii	Cronquist daisy	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree	Sensitive
Erigeron garrettii	Garrett's daisy	Perennial	Herb	Rock Cliffs/ Crevices, Talus/Scree Subalpine, Alpine	Rec. Sensitive
Eriogonum brevicaule var. *loganum*	Logan buckwheat	Perennial	Herb	Mountain Forest, Rock Cliffs/ Crevices Talus /Scree, Shrubland, Woodland, Alpine, Subalpine	Sensitive
Ivesia utahensis	Utah Ivesia	Perennial	Herb	Alpine, Rock Cliffs/ Crevices Talus /Scree	Rec. Sensitive
Jamesia americana var. *macrocalyx*	Wasatch Jamesia, Wasatch cliff-bush	Perennial	Shrub	Rock Cliffs/ Crevices Talus /Scree	Sensitive
Lathyrus lanszwertii var. *Lanszwertii*	Nevada Sweetpea	Perennial	Forb	Woodland	Watch
Lepidium montanum var. *alpinum*	Alpine pepper plant, Wasatch pepper-wort	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree	Rec. Sensitive
Lesquerella garrettii	Garrett's bladderpod	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree, Subalpine	Sensitive
Lesquerella utahensis	Utah bladderpod	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree Shrubland, Riparian Meadows/Seeps, Alpine	Watch
Musineon lineare	Rydberg's musineon	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree	Watch
Papaver radicatum ssp *kluanense*	Alpine poppy	Perennial	Herb	Alpine, Rock Cliffs/ Crevices Talus /Scree	Sensitive

Table F-1. Habit, Lifeform, Habitat Group, and Plant Status (USFS and UCDC) of the SAR Plants that occur on the Wasatch-Cache National Forest

Species Name	Common Name	Habit	Lifeform	Habitat group	Plant Status
Pedicularis parryi ssp. *Mogollonica*	Mogollon Lousewort	Perennial	Herb	Mountain Forst Shrubland Woodland Alpine	Watch
Penstemon compactus	Cache beardtongue	Perennial	Herb	Subalpine, Rock Cliffs/ Crevices Talus /Scree	Sensitive
Penstemon platyphyllus	Broad-leaf beardtongue, Broad-leaf penstemon	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree, Woodland	Rec. Sensitive
Penstemon uintahensis	Uinta beardtongue	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree, Alpine, Subalpine	Watch
Porterella carnosula	Western Porterella	Annual	Herb	Riparian Meadows/Seeps	Watch
Potamogeton foliosus var *fibrillosus*	fibrous-stipuled pond-weed	Perennial	Aquatic Herb	Riparian Meadows/Seeps	Watch
Potentilla cottamii	Cottam's cinquefoil, Cottam's Potentilla	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree	Sensitive
Potentilla pensylvanica var. *paucijuga*	Alpine cinquefoil, few-leaflet cinquefoil	Perennial	Herb	Alpine, High Elevation Grassland	Rec. Sensitive
Primula maguirei	Maguire's primrose	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree Woodlands	Threatend
Spiranthes diluvialis	Ute ladies'-tresses	Perennial	Herb	Riparian Meadows/Seeps	Threatened
Thelesperma pubescens	Uinta greenthread	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree	Sensitive
Viola beckwithii	Beckwith's violet	Perennial	Herb	High elevation grassland, Woodland, Shrubland	Sensitive
Viola frank-smithii	Frank Smith’s Violet	Perennial	Herb	Rock Cliffs/ Crevices Talus /Scree	Sensitive

Plant Status- Recommended Sensitive is abbreviated as Rec. Sensitive.

Table F-2. Rating of Impacts to Plant Species at Risk that occur on the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Grazing	Recreation	ORV's	Wildlife	Hiking/Trampling	Rock Climbing	Chemical Treatment	Logging	Collection	Fire Suppression	No Information	No Known Threats	SUMMARY	REFERENCES
Abies concolor												X	No Known Threats	
Angelica wheeleri	1	1											Trampling by livestock, hikers	1, 2, 3
Arabis glabra var. *furcatipilis*											X		No information	1, 2, 3
Arabis lasiocarpa											X		No information	1, 2, 3
Artemisia norvegica var. *piceetorum*											X		No information	
Aster sibericus var. *meritus*											X		No information	
Astragalus flexuosus var. *flexuosus*											X		No information	
Astragalus jejunus var. *jejunus*	1												Trampling by livestock	
Astragalus robbinsii											X		No information	
Botrychium crenulatum	1		1										Trampling by livestock, ORV	
Botrychium lineare		1											Recreation	
Cirsium eatonii var. *murdockii*											X		No information	
Corydalis caseana ssp *brachycarpa*											X		No information	1, 2, 3
Cymopterus acaulis var. *parvus*											X		No information	
Cymopterus lapidosus											X		No information	
Cypripedium calceolus ssp *parviflorum*											X		No information	
Cypripedium fasciculatum								1					Forest fragmentation	5, 62, 63
Dodecatheon dentatum var. *utahense*					3	2							Rock climbing, trampling by hikers picnic area	61
Draba brachystylis											X		No information	
Draba globosa (D. densifolia var. *apiculata)*				1									Introduced mountain goats	6, 20, 48
Draba maguirei sensu lato											X		No information	37, 46, 65

Table F-2. Rating of Impacts to Plant Species at Risk that occur on the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Grazing	Recreation	ORV's	Wildlife	Hiking/Trampling	Rock Climbing	Chemical Treatment	Logging	Collection	Fire Suppression	No Information	No Known Threats	SUMMARY	REFERENCES
Draba maguirei var. *burkei*		2											Hiking, mountain biking, rock scrambling	47
Epipactis gigantea											X		No information	
Erigeron arenarioides											X		No information	
Erigeron cronquistii											X		No information	34, 41, 64
Erigeron garrettii											X		No information	
Eriogonum brevicaule var. *loganum*											X		No information	36
Ivesia utahensis				1	2								Trampling by hikers, trails, wildlife	21
Jamesia americana var. *macrocalyx*				1	1	1							Rock climbing, Trampling by hikers, trails, wildlife	22, 60, 31
Lathyrus Lanszwertii var. *Lanswerti*											X		No Information	
Lepidium montanum var. *alpinum*				1		1							Rock climbing, Trampling by hikers, trails	
Lesquerella garrettii				1	1	1							Rock climbing, Trampling by hikers, trails, wildlife	18,23,25,27,28
Lesquerella utahensis											X		No Information	59
Musineon lineare												X	No Known Threats	
Papaver radicatum ssp *kluanense*											X		No Information	16, 39
Pedicularis parryi ssp. Mogollonica											X		No Information	
Penstemon compactus	1												Livestock trampling	35, 43
Penstemon platyphyllus											X		No Information	
Penstemon uintahensis												X	No Known Threats	

Table F-2. Rating of Impacts to Plant Species at Risk that occur on the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Grazing	Recreation	ORV's	Wildlife	Hiking/Trampling	Rock Climbing	Chemical Treatment	Logging	Collection	Fire Suppression	No Information	No Known Threats	SUMMARY	REFERENCES
Porterella carnosula											X		No Information	
Potamogeton foliosus var *fibrillosus*											X		No Information	
Potentilla cottamii											X		No Information	
Potentilla pensylvanica var. *paucijuga*											X		No Information	
Primula maguirei						3			1				Rock climbing, personal collection	32,10,49,50,51,51,53,54
Spiranthes diluvialis					1								Trampling by hikers	11,12,13,14,26,55,56,57,58
Thelesperma pubescens	1												Livestock trampling	7, 8
Viola beckwithii											X		No Information	
Viola frank-smithii						3							Rock climbing	33, 44

Table F-3. Effects of Alteration of Ecological Factors for the Plant Species at Risk for the Wasatch-Cache National Forest (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Fire Exclusion	Fire Inclusion	Genetic Purity	Changes in Hydrology	Insects/Disease	Loss of Pollinators	Non-native Species	Natural Conditions	Pollution	Seed Bank	Succession	No Information	No Known Threats	Summary	REFERENCES
Abies concolor												X		No Information	
Angelica wheeleri				1			1							Alteration of hydrologic regime,	1, 2, 3
Arabis glabra var *furcatipilis*												X		No Information	1, 2, 3
Arabis lasiocarpa												X		No Information	1, 2, 3
Artemisia norvegica var. *piceetorum*												X		No Information	
Aster sibericus var. *meritus*												X		No Information	
Astragalus flexuosus var. *flexuosus*												X		No Information	
Astragalus jejunus var. *jejunus*												X		No Information	
Astragalus robbinsii												X		No Information	
Botrychium crenulatum												X		No Information	
Botrychium lineare												X		No Information	
Cirsium eatonii var. *murdockii*												X		No Information	
Corydalis caseana ssp *brachycarpa*												X		No Information	1, 2, 3
Cymopterus acaulis var. *parvus*												X		No Information	
Cymopterus lapidosus												X		No Information	
Cypripedium calceolus ssp *parviflorum*				1										Alteration of moisture regime	
Cypripedium fasciculatum												X		No Information	5, 62, 63
Dodecatheon dentatum var. *utahense*												X		No Information	61
Draba brachystylis												X		No Information	
Draba globosa (D. densifolia var. *apiculata)*												X		No Information	6, 20, 48

Table F-3. Effects of Alteration of Ecological Factors for the Plant Species at Risk for the Wasatch-Cache National Forest (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Fire Exclusion	Fire Inclusion	Genetic Purity	Changes in Hydrology	Insects/Disease	Loss of Pollinators	Non-native Species	Natural Conditions	Pollution	Seed Bank	Succession	No Information	No Known Threats	Summary	REFERENCES
Draba maguirei sensu lato												X		No Information	37, 46, 65
Draba maguirei var. *burkei*												X		No Information	47
Epipactis gigantea												X		No Information	
Erigeron arenarioides												X		No Information	
Erigeron cronquistii												X		No Information	34, 41, 64
Erigeron garrettii												X		No Information	
Eriogonum brevicaule var. *loganum*												X		No Information	36
Ivesia utahensis												X		No Information	21
Jamesia americana var. *macrocalyx*												X		No Information	22, 60, 31
Lathyrus Lanszwertii var. *Lanszwerti*												X		No Information	
Lepidium montanum var. *alpinum*												X		No Information	
Lesquerella garrettii												X		No Information	18,23,25,27,28
Lesquerella utahensis												X		No Information	59
Musineon lineare												X		No Information	
Papaver radicatum ssp *kluanense*												X		No Information	16, 39
Pedicularis parryi ssp. *Mogollonica*												X		No Information	
Penstemon compactus												X		No Information	35, 43
Penstemon platyphyllus												X		No Information	
Penstemon uintahensis												X		No Information	
Porterella carnosula												X		No Information	
Potamogeton foliosus var *fibrillosus*												X		No Information	
Potentilla cottamii												X		No Information	

Table F-3. Effects of Alteration of Ecological Factors for the Plant Species at Risk for the Wasatch-Cache National Forest (1= Low, 2= Moderate, 3= High)

SPECIES NAME	Fire Exclusion	Fire Inclusion	Genetic Purity	Changes in Hydrology	Insects/Disease	Loss of Pollinators	Non-native Species	Natural Conditions	Pollution	Seed Bank	Succession	No Information	No Known Threats	Summary	REFERENCES
Potentilla pensylvanica var. *paucijuga*												X		No Information	
Primula maguirei									1					Dust pollution from road expansion	32,10,49,50,51,51,53,54
Spiranthes diluvialis				1		1								Altered pollinator frequencies and hydrologic regime	11,12,13,14,26,55,56,57,58
Thelesperma pubescens												X		No Information	7, 8
Viola beckwithii												X		No Information	
Viola frank-smithii									1					Dust pollution from road expansion	33, 44

Table F-4. Factors with Potential to Reduce Habitat for the Plant Species at Risk for the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High**)**

SPECIES NAME	Agriculture	Energy	Facilities	Military Activities	Mining Activities	Road Construction	Ski areas	Transmission Lines	Trail construction	Urban development	Timber harvest	No Information	No Known Threats	SUMMARY	REFERENCES
Abies concolor												X		No Information	
Angelica wheeleri						1		1		1				Urban development, road construction, lines	1, 2, 3
Arabis glabra var *furcatipilis*						1								road construction	1, 2, 3
Arabis lasiocarpa						1								road construction	1, 2, 3
Artemisia norvegica var. *piceetorum*												X		No information	
Aster sibericus var. *meritus*												X		No information	
Astragalus flexuosus var. *flexuosus*												X		No information	
Astragalus jejunus var. *jejunus*												X		No information	
Astragalus robbinsii												X		No information	
Botrychium crenulatum												X		No information	
Cirsium eatonii var. *murdockii*												X		No information	
Corydalis caseana ssp brachycarpa												X		No information	1, 2, 3
Cymopterus acaulis var. *parvus*												X		No information	
Cymopterus lapidosus												X		No information	
Cypripedium calceolus ssp *parviflorum*												X		No information	
Cypripedium fasciculatum											1			Activities associated with timber harvest	5, 62, 63
Dodecatheon dentatum var. *utahense*												X		No information	61
Draba brachystylis												X		No information	
Draba globosa (D. densifolia var. *apiculata)*												X		No information	6, 20, 48

Table F-4. Factors with Potential to Reduce Habitat for the Plant Species at Risk for the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High**)**

SPECIES NAME	Agriculture	Energy	Facilities	Military Activities	Mining Activities	Road Construction	Ski areas	Transmission Lines	Trail construction	Urban development	Timber harvest	No Information	No Known Threats	SUMMARY	REFERENCES
Draba maguirei sensu lato												X		No information	37, 46, 65
Draba maguirei var. *burkei*						3	3	2						Communications tower, roads, Snowbasin expansion	47
Epipactis gigantea												X		No information	
Erigeron arenarioides												X		No information	
Erigeron cronquistii						1								Road construction	34, 41, 64
Erigeron garrettii												X		No information	
Eriogonum brevicaule var. *loganum*										X				Urban development	36
Ivesia utahensis							1							Alta ski resort activities	21
Jamesia americana var. *macrocalyx*							1							Solitude ski resort activities	22, 60, 31
Lathyrus lanszwertii var.*lanswerti*												X		No information	
Lepidium montanum var. *alpinum*												X		No information	
Lesquerella garrettii												X		No information	18,23,25,27,28
Lesquerella utahensis						1	1							Ski area activities, road construction	59
Musineon lineare (Rydb.) Mathias												X		No Information	
Pedicularis parryi ssp. *Mogollonica*												X		No Information	
Papaver radicatum ssp *kluanense*												X		No information	16, 39
Penstemon compactus												X		No information	35, 43
Penstemon platyphyllus												X		No information	
Porterella carnosula												X		No Information	

Table F-4. Factors with Potential to Reduce Habitat for the Plant Species at Risk for the Wasatch-Cache National Forest. (1= Low, 2= Moderate, 3= High**)**

SPECIES NAME	Agriculture	Energy	Facilities	Military Activities	Mining Activities	Road Construction	Ski areas	Transmission Lines	Trail construction	Urban development	Timber harvest	No Information	No Known Threats	SUMMARY	REFERENCES
Potamogeton foliosus var *fibrillosus*												X		No information	
Potentilla cottamii												X		No information	
Potentilla pensylvanica var. *paucijuga*												X		No information	
Primula maguirei			1			1								Expansion of Highway 89, facilities	32,10,49,50,51,51, 53,54
Spiranthes diluvialis			1											Facilities associated with water diversion	11,12,13,14,26,55, 56,57,58
Thelesperma pubescens		1												Oil exploration	7, 8
Townsendia alpigena var. *caelilnensis*												X		No information	
Viola beckwithii										1				Urban development	
Viola frank-smithii			1			1								Expansion of Highway 89, facilities	33, 44

Table F-5. References used in Botanical Resources

Scientific Name	Authors	Year	Title	Source	Ref. ID #
Aster kingii var. barnebyana	Brasher, J.W.	1996	Final Report on the 1995 Sensitive Plant Survey for the Uinta and Wasatch-Cache National Forests	Wasatch-Cache National Forest. Salt Lake City, Utah.	30
Aster kingii var. barnebyana	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	18
Aster kingii var. kingii	Tuhy, J.S.	1991	Aster kingii (King Aster) and Lesquerella garrettii (Garrett Bladderpod) on the Uinta and Wasatch-Cache National Forests, Utah. Final Report for Challenge Cost Share Agreements with the Uinta and Wasatch-Cache National Forests.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	24
Aster kingii var. kingii	Brasher, J.W.	1996	Final Report on the 1995 Sensitive Plant Survey for the Uinta and Wasatch-Cache National Forests	Wasatch-Cache National Forest. Salt Lake City, Utah.	29
Aster kingii var. kingii	Franklin, M.A. "Ben".	1990	Report for 1989 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Erigeron cronquistii, Musineon lineare, and Penstemon cyanthus var. compactus.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	45
Aster kingii var. kingii	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	19
Cypripedium fasciculatum	Franklin, M.A. "Ben".	1990	Report for 1990 Challenge Cost Share project, Ashley National Forest. Target species: Cypripedium fasciculatum Kellogg ex Wats. (Clustered lady's-slipper).	Utah Natural Heritage Program, Department of Natural Resources. Salt Lake City, Utah.	63
Cypripedium fasciculatum	Wallentine, K.J.	1993	TES Plant Field Data Reports with cover letter. Cypripedium fasciculatum.		62
Cypripedium fasciculatum	Caicco, S.L.	1987	Special plant survey forms for Lower Selway and Lochsa Rivers vicinity: Mimulus clivicola and Cypripedium fasciculatum.	Idaho Conservation Data Center	5
Dodecatheon dentatum var. utahense	Clapier, K.B. and K. Nichols	1997	TES Plant Field Data Reports. Dodecatheon dentatum var. utahense.	Wasatch-Cache National Forest. Salt Lake City, Utah.	61
Draba globosa (D. densifolia var. apiculata)	Windham, M.D., and M. Beilstein.	1998	A Taxonomic Study of Draba maguirei and Allied Taxa (Brassicaceae)	Utah Museum of Natural History and Department of Natural History, University of Utah. Salt Lake City, Utah.	48
Draba globosa (D. densifolia var. apiculata)	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	20
Draba globosa (D. densifolia var. apiculata)	Stone, D.R.	1995	Status Review of Draba Globosa and Related Species. Final Report for 1994 Challenge Cost Share Project.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	6

Table F-5. References used in Botanical Resources

Scientific Name	Authors	Year	Title	Source	Ref. ID #
Draba maguirei sensu lato	Windham, M.D., and M. Beilstein.	1998	A Taxonomic Study of Draba maguirei and Allied Taxa (Brassicaceae)	Utah Museum of Natural History and Department of Natural History, University of Utah. Salt Lake City, Utah.	46
Draba maguirei sensu lato	Padgett, W.G.	1997	TES Plant Field Data Reports. Draba maguirei var. maguirei. Woodcamp Survey.	Wasatch-Cache National Forest. Salt Lake City, Utah.	65
Draba maguirei sensu lato	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	37
Draba sp 2 (D. burkei nom nov.)	Windham, M.D., and M. Beilstein.	1998	A Taxonomic Study of Draba maguirei and Allied Taxa (Brassicaceae)	Utah Museum of Natural History and Department of Natural History, University of Utah. Salt Lake City, Utah.	47
Erigeron cronquistii	Padgett, W.G.	1998	TES Plant Field Data Reports. Erigeron cronquistii.	Wasatch-Cache National Forest. Salt Lake City, Utah.	64
Erigeron cronquistii	Franklin, M.A. "Ben".	1990	Report for 1989 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Erigeron cronquistii, Musineon lineare, Penstemon cyanthus var. compactus.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	41
Erigeron cronquistii	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	34
Eriogonum brevicaule var. loganum	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	36
Ivesia utahensis	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	21
Jamesia americana var. macrocalyx	Nichols, K.	1995	TES Plant Field Data Reports. Jamesia americana var. macrocalyx.	Uinta and Wasatch-Cache National Forest. Salt Lake City, Utah.	60
Jamesia americana var. macrocalyx	Brasher, J.W.	1996	Final Report on the 1995 Sensitive Plant Survey for the Uinta and Wasatch-Cache National Forests	Wasatch-Cache National Forest. Salt Lake City, Utah.	31
Jamesia americana var. macrocalyx	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	22
Lesquerella garrettii	Tuhy, J.S.	1991	Aster kingii (King Aster) and Lesquerella garrettii (Garrett Bladderpod) on the Uinta and Wasatch-Cache National Forests, Utah. Final Report for Challenge Cost Share Agreements with the Uinta and Wasatch-Cache National Forests.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	25

Table F-5. References used in Botanical Resources

Scientific Name	Authors	Year	Title	Source	Ref. ID #
Lesquerella garrettii	Tuhy, J.S.	1993	Monitoring Study of Lesquerella garrettii (Garrett Bladderpod) on the Uinta and Wasatch- Cache National Forests, Utah. Final Report for Challenge Cost Share Agreements with the Uinta and Wasatch-Cache National Forests.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	27
Lesquerella garrettii	Brasher, J.W.	1996	A Floristic Study of the Southern Wasatch Mountains, Utah. Thesis.	Department of Botany and Range Science. Brigham Young University. Provo, Utah.	23
Lesquerella garrettii	Brasher, J.W.	1996	Final Report on the 1995 Sensitive Plant Survey for the Uinta and Wasatch-Cache National Forests	Wasatch-Cache National Forest. Salt Lake City, Utah.	28
Lesquerella utahensis	Clapier, K.B.	1997	Botanical Survey and Inventory Record	Wasatch-Cache National Forest. Salt Lake City, Utah.	59
Multiple	Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins.	1993	A Utah Flora (2nd ed., revised).	Brigham Young University. Provo, Utah.	3
Multiple	USDA, NRCS	1999	The PLANTS database (http://plants.usda.gov/plants).	National Plant Data Center, Baton Rouge, LA 70874-4490 USA.	4
Multiple	UNHP.	1999	Challenge Cost Share Agreement Between the Utah Division of Wildlife Resources and the USDA Forest Service, Wasatch-Cache National Forest.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	2
Multiple	Utah Natural Heritage Program.	1998	Element Occurrence Database	Utah Division of Wildlife Resources. Salt Lake City, Utah.	1
Papaver radicatum ssp *kluanense*	Franklin, M.A. "Ben".	1989	Report for 1988 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	39
Papaver radicatum ssp *kluanense*	Franklin, M.A. "Ben".	1991	Report for 1990 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	16
Penstemon compactus	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	35
Penstemon compactus	Franklin, M.A. "Ben".	1990	Report for 1989 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Erigeron cronquistii, Musineon lineare, Penstemon cyanthus var. compactus.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	43

Table F-5. References used in Botanical Resources

Scientific Name	Authors	Year	Title	Source	Ref. ID #
Penstemon uintahensis	Franklin, M.A. "Ben".	1991	Report for 1990 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	17
Penstemon uintahensis	Franklin, M.A. "Ben".	1989	Report for 1988 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Parrya rydbergii, Papaver radicatum var. pygmaaeum, and Penstemon uintahensis.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	40
Primula maguirei	USDA, FS	1990	Maguire Primrose (Primula maguirei) Recovery Plan.	U.S. Fish and Wildlife Service. Denver, Colorado.	49
Primula maguirei	Padgett, W.G.	1987	Maguire Primrose Summary Report.	Utah Native Plant Society. Logan, Utah.	50
Primula maguirei	Beedlow, P.A., J.G. Carter, and F.J. Smith	1980	Primula maguirei L. Wms. (Primulaceae): A Preliminary Report on the Population Biology of an Endemic Plant.	Bio-Resources, Inc. Logan, Utah.	51
Primula maguirei	USDA, FS.	1989	Threatened, Endangered, and Sensitive Plant Program Action Plan.	Forest Service Intermountain Region. Ogden, Utah.	10
Primula maguirei	Wolf, P.G., and R.B. Sinclair.	1997	Highly differentiated populations of the narrow endemic plant Maguire primrose (Primula maguirei).	Conservation Biology; Vol. 11, no. 2 (Apr. 1997): p. 375-378.	53
Primula maguirei	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	32
Primula maguirei	Welsh, S.L.	1987	Logan Canyon, U.S. 89 Study, Biological Assessment of Maguire Primrose Near Wood Camp.	Report to UDOT.	54
Primula maguirei	Padgett, W.G.	1990	Hydrothermograph Report for the Wood Camp Population of Maguire Primrose (Primula maguirei L. Williams).	Logan Ranger District, Wasatch-Cache National Forest. Logan, Utah.	52
Spiranthes diluvialis	US Fish and Wildlife Service.	1995	DRAFT Ute ladies'-tresses (Spiranthes diluvialis) recovery plan.	U.S. Fish and Wildlife Service. Denver, Colorado.	13
Spiranthes diluvialis	Pierson, K. and V.J. Tepedino.	2000	The Pollination and Reproduction of Spiranthes diluvialis: Implications for Conservation of Four Populations.	USDA Forest Service Challenge Cost Share Program. Uinta National Forest. Provo, Utah. USDI Fish and Wildlife Service. Salt Lake City, Utah.	55
Spiranthes diluvialis	Sheviak, C.J.	1984	Spiranthes diluvialis (Orchidaceae), A New Species from the Western United States.	New York Botanical Garden. Bronx, New York. Brittonia 36 (1). Pp.8-14.	14
Spiranthes diluvialis	US Fish and Wildlife Service.	1995	Recommendations and Guidelines for Ute Ladies'-tresses Orchid (Spiranthes diluvialis) Recovery and Fulfilling Section 7 Consultation Responsibilities.	U.S. Fish and Wildlife Service, Utah Field Office. Salt Lake City, Utah.	58
Spiranthes diluvialis	USDA, FS.	1995	DRAFT Diamond Fork/Spanish Fork Watershed Management Plan.	Resource Management International.	12

Table F-5. References used in Botanical Resources

Scientific Name	Authors	Year	Title	Source	Ref. ID #
Spiranthes diluvialis	Stone, D.R.	1993	Final Report for 1992 Challenge Cost Share Project, Uinta and Wasatch-Cache National Forests.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	26
Spiranthes diluvialis	Sipes, S.D., and V.J. Tepedino.	1995	The Pollination and Reproduction of Spiranthes diluvialis: Implications for Conservation of Four Populations.	USDA Forest Service Challenge Cost Share Program. Uinta National Forest. Provo, Utah. USDI Fish and Wildlife Service. Salt Lake City, Utah.	11
Spiranthes diluvialis	Jennings, W.F.	1990	Letter to J.L. England, Botanist, U.S. Fish and Wildlife Service. Salt Lake City, Utah.	Louisville, Colorado.	56
Spiranthes diluvialis	Sheviak, C.J.	1990	Letter to J.L. England, Botanist, U.S. Fish and Wildlife Service. Salt Lake City, Utah.	The University of the State of New York. Albany, New York.	57
Thelesperma pubescens	Glisson, B.	1995	DRAFT Conservation Strategy and Action Plan for Thelesperma pubescens (Uinta Greenthread)	IHC Environmental. Salt Lake City, Utah	8
Thelesperma pubescens	Hollis, M.	1988	Inventory and Monitoring of Thelesperma pubescens on the Wasatch National Forest and the Rock Springs District of the Bureau of Land Management.	Wyoming Natural Diversity Database, Rocky Mountain Heritage Task Force, and the Nature Conservancy.	7
Viola frank-smithii	Franklin, M.A. "Ben".	1990	Report for 1989 Challenge Cost Share Project, Wasatch-Cache National Forest. Target Species Erigeron cronquistii, Musineon lineare, and Penstemon cyanthus var. compactus.	Utah Department of Natural Resources, Utah Natural Heritage Program. Salt Lake City, Utah.	44
Viola frank-smithii	Glisson, B.	1995	Conservation Strategy and Action Plan, Bear River Endemics. Prepared for the Wasatch-Cache National Forest.	Industrial Health Incorporated. Salt Lake City, Utah.	33

APPENDIX G

Oil and Gas Lease Issuing Process and Stipulations

In many places in the Unites States, National Forests lie over geological formations, which do, or may, contain oil or natural gas. Private firms purchase "leases" on many of these lands to search for oil or gas, to drill exploratory wells, and to extract any oil or gas located below them.

Lease

Individuals, associations of citizens, and corporations organized under the laws of the United States or any state, are entitled to lease Federal lands for these purposes under authority of the Mineral Leasing Act of 1920, as amended, and by the Mineral Leasing Act for Acquired Lands of 1947 unless the lands have been specifically withdrawn by the Department of the Interior. Leases also may be issued to a legal guardian or trustee on behalf of a minor. Aliens, whose country of origin does not deny similar privileges to United States citizens, may hold interest in leases, but only through stock ownership of United States corporations that hold leases. Aliens may not hold interest in Federal oil and gas leases through units in publicly traded limited partnerships.

The issuance of a lease grants to the lessee the exclusive right to use so much of the leased lands as is necessary to explore for, drill for, mine, extract, remove, and dispose of all the oil and gas (except helium) in the leasehold subject to stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed. To the extent consistent with lease rights granted, such reasonable measures may include, but are not limited to, modification to siting or design or facilities, timing of operations, and specifications of interim and final reclamation measures. At a minimum, measures shall be deemed consistent with the lease rights granted provided that they do not require relocation of proposed operations by more than 200 meters, require that operations be sited off the leasehold, or prohibit new surface disturbing operations for a period in excess of 60 days in an lease year (43 CFR 3102.1-2).

Competitive and Noncompetitive Leases

Competitive and noncompetitive leases may be obtained for oil and gas exploration and development on lands owned or controlled by the Federal government. The Leasing Reform Act of 1987 requires all public lands available for oil and gas leasing to be offered first by competitive leasing at an oral auction. Noncompetitive leases may be issued only if the competitive process results in no bids. Competitive and noncompetitive leases are issued for a ten-year period. Both are extended for the duration that they are producing oil and gas in paying quantities. The maximum competitive lease size is 2,560 acres in the "lower" 48 state and 5,760 in Alaska. The maximum noncompetitive lease size is 10, x0 acres in all states.

Competitive Leases

The Bureau of Land Management (BLM) conducts oral auctions for oil and gas leases on at least a quarterly basis, when there are available parcels of land. A Notice of Competitive Lease Sale lists lease parcels to be offered at auction. The Sale Notice is published at least 45 days before the date of the auction. The Sale Notice identifies any lease stipulations to uses or restrictions on surface occupancy. There are three sources for Federal lands available for lease:

(1) existing leases that have expired, and leases that have been terminated, canceled, or relinquished,

(2) parcels identified by informal expressions of interest from either the public or BLM for management reasons, and

(3) lands included in offers filed for noncompetitive leases (effective January 3, 1989).

On the day of the auction, successful bidders must submit a properly executed lease bid form and make a payment consisting of an administrative fee ($75 per parcel), one-year advance rental ($1.50 per acre), and not less than the $2.00 per acre minimum bonus. The balance of the bonus bid must be received within ten working days of the auction. The bid form constitutes the legally binding lease offer.

Noncompetitive Leases

Noncompetitive leases may be issued only for parcels that have been offered competitively and failed to receive a bid. Lands in expired, terminated, cancelled, or relinquished leases are not available for noncompetitive leasing until they have been offered competitively. After an auction, all lands that were offered competitively without receiving a bid are available for filing of noncompetitive offers for a period of two years.

Noncompetitive offers must be submitted on a BLM-approved form, and they must include a $75 filing fee, and one-year advance rental ($1.50 per acre).

Noncompetitive lease offers filed on the first business day following the auction are considered as having been filed simultaneously. The priority among multiple offers received on the first business day for the same parcel are determined by drawings open to the public.

Lease Restrictions

A lease does not convey an unlimited right to explore or an unlimited right to develop any oil or gas resources found under the land. Leases are subject to terms and conditions. These are restrictions derived from legal statutes and measures to minimize adverse impacts to other resources and are generally characterized in a lease as stipulations. Stipulations modify the rights the government grants to a lessee. The stipulations are known by potential lessees prior to any sale and must be applied at the time of Application for Permit to Drill (APD).

Standard Lease Terms

The Standard Lease Terms are contained in Form 3100-11, Offer to Lease and Lease for Oil and Gas, United States Department of the Interior, BLM, June 1988 or later addition (see Appendix B). The Standard Lease Terms provide the lessee the right to use the leased land as needed to explore for, drill for, extract, remove and dispose of oil and gas deposits located under the leased lands. Operations must be conducted in a manner that minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as other land uses or users. Federal environmental protection laws such as the Clean Water Act, Endangered Species Act, and Historic Preservation Act, will be applied to all lands and are included in the standard lease stipulations. If threatened or endangered species, objects of historic, cultural, or scientific value, or substantial unanticipated environmental effects are encountered during construction, all work affecting the resource will stop and the land management agency will be contacted. Surface-disturbing operations that would destroy or harm these species or objects are prohibited.

Standard Lease Terms provide for reasonable measures to minimize adverse impacts to surface resources. These include, but are not limited to, modifications to the siting or design of facilities, timing of operations, and specifications of interim and final reclamation measures. Standard Lease Terms may not require the lessee to relocate drilling rigs or supporting facilities by more than 200 meters, require that operations be sited off the leasehold, or prohibit new surface-disturbing operation for more that 60 days each year (43 CFR part 3101.I-2).

The lease requires that the lessee meet stipulation conditions or avoid activities within all, or an identified part, of the leasehold. All leases on National Forest System lands contain the "Stipulation for Lands of the National Forest System Under Jurisdiction of Department of Agriculture," requiring the lessee to comply with the rules and regulations of the Department of Agriculture. All leases are subject to regulations and formal orders of the Secretaries of the Interior and Agriculture in effect at the time of issuance.

Supplemental Stipulations

The Standard Lease Terms can be modified by special or supplemental stipulations attached to the lease (43 CFR 3101.I-2 through 3101.I4). Additional special stipulations can be developed specifically to meet resource concerns that cannot be mitigated by existing stipulations. The following supplemental stipulations have been developed for the Wasatch-Cache National Forest. Applicable stipulations will be applied as shown on the leasing alternative maps.

Section A shows the list of stipulations that apply to identified resources within the Appeal Settlement Zone and the area of the 1994 Leasing Decision. Section B shows the stipulations that apply to the Appeal Settlement Zone. Section C shows the stipulations that apply to the area of 1994 Leasing Decision

SECTION A:
Stipulations that apply to identified resources within the Appeal Settlement Zone and the area of the 1994 Leasing Decision

RESOURCE: Elk Calving Areas
Stipulation: Timing Limitation
Objective: To preclude the commencement of surface disturbing activities within the elk calving area that could cause increased stress and/or displacement of animals during the critical time period (May 1 to June 30).

RESOURCE: Elk Winter Range
Stipulation: Timing Limitation
Objective: To preclude the commencement of surface disturbing activities within the elk winter range that could cause increased stress and/or displacement of animals during the critical time period (November 15 to April 30).

RESOURCE: Elk Spring Use Area
Stipulation: Timing Limitation
Objective: To preclude the commencement of surface disturbing activities within the elk Spring use area that could cause increased stress and/or displacement during the critical time period (May 1 to June 30).

RESOURCE: Moose Winter Range
Stipulation: Timing Limitation
Objective: To preclude the commencement of surface disturbing activities within the moose Winter range that could cause increased stress and/or displacement of animals during the critical time period (November 15 to April 30).

RESOURCE: Bighorn Sheep Lambing Area
Stipulation: Timing Limitation
Objective: To preclude the commencement of surface disturbing activities within the bighorn sheep lambing area that could cause increased stress and/or displacement of animals during the critical time period (May 1 to June 30).

RSOURCE: Sensitive Wildlife Species
Stipulation: Controlled Surface Use – a survey would be required prior to surface disturbing activities to determine the possible presence of any sensitive wildlife species and operations be designed and/or located so as to not adversely affect the viability of the species. (A Controlled Surface Use stipulation requiring surveys for sensitive wildlife species will be included in all leases because the extent of these species has not yet been mapped.)
Objective: To ensure that proposed activities do not adversely affect the viability of a wildlife species.

RESOURCE: Sensitive Plants

Stipulation: Controlled Surface Use – a survey would be required prior to surface disturbing activities to determine the possible presence of any sensitive plant species and operations be designed or located so as to not adversely affect the viability of the plant species. (A Controlled Surface Use stipulation requiring surveys for sensitive plant species will be included in all leases because the extent of these species has not yet been mapped.)
Objective: To ensure that proposed activities do not adversely affect the viability of a plant species.

RESOURCE: Geologic Hazards and Unstable Soils
Stipulation: Controlled surface Use
Objective: To require that activities be located and or designed to avoid or minimize the potential for adverse effects to unstable areas and to ensure that the area can be reclaimed.

RESOURCE: Slopes >40%
Stipulation: No Surface Occupancy
Objective: To preclude construction of well sites and related facilities such as tank batteries on slopes over 40% that would involve relatively large cut and fill slopes and would be difficult to rehabilitate.

RESOURCE: Riparian Areas >40 acres
Stipulation: No Surface Occupancy
Objective: To preclude surface disturbing activities and protect riparian areas.

RESOURCE: Wetland Areas >40 acres
Stipulation: No Surface Occupancy
Objective: To preclude surface disturbing activities and protect jurisdictional wetlands relative to Executive Order 11990.

SECTION B:
The following stipulations apply to the Appeal Settlement Zone

RESOURCE: Backcountry Recreation (Management Prescription 4.1 in areas of high quality backcountry recreation values)
Stipulation: No Surface Occupancy
Objective: To maintain backcountry non-motorized recreation opportunities in remote and isolated settings with the environment in a near-natural state.

RESOURCE: Backcountry Recreation (Management Prescription 4.1 and 4.2)
Stipulation: Controlled Surface Use – This stipulation would be required in areas where there is a desire to provide nonmotorized recreation opportunities yet allow industry more flexibility in developing oil and gas reserves. Proposed activities would be required to be located and/or screened away from dispersed use camping areas and trails and important viewpoints. Restoration of any site-disturbing activities is required after operations have ceased.

Objective: To maintain nonmotorized recreation opportunities in remote settings.

RESOURCE: Undeveloped Lands (Management Prescription 2.6)
Stipulation: No Surface Occupancy
Objective: To protect undeveloped landscapes and assure that the unique qualities associated with these areas are recognized and preserved.

RESOURCE: Scenery Management System
Stipulation: Controlled Surface Use – proposed activities would be required to be located and/or designed to meet Naturally Appearing landscape character theme and high scenic integrity objective.
Objective: To maintain the highly valued scenic quality of the area.

RESOURCE: Scenery Management System
Stipulation: Controlled Surface Use – proposed activities would be required to be located and/or designed to meet Naturally Appearing landscape character theme and moderate scenic integrity objective.
Objective: To maintain the highly valued scenic quality of the area.

RESOURCE: Eligible Wild and Scenic River Corridor
Stipulation: Controlled Surface Use – proposed activities would be required to protect identified outstandingly remarkable value(s) until such time the Suitability is determined.
Objective: To maintain identified outstandingly remarkable value(s)

SECTION C:
The following stipulations apply to the area of the 1994 Leasing Decision. In the case of Visual Quality Objectives, they will be replaced with Scenery Management System stipulations.

RESOURCE: Retention Visual Quality Objectives
Stipulation: Controlled Surface Use – proposed activities would be required to be located and/or designed to meet the visual quality objective of retention within one year of commencing operations.
Objective: To ensure that the visual quality of the area is maintained.

RESOURCE: Partial Retention Visual Quality Objective
Stipulation: Controlled Surface Use – proposed activities would be required to be located and/or designed to meet the visual quality objective of partial retention within one year of commencing operations.
Objective: To maintain the highly valued scenic quality of the area.

RESOURCE: Developed Campgrounds and Trailheads
Stipulation: No Surface Occupancy
Objective: To precludes surface occupancy and new surface disturbing activities within developed recreation sites.

RESOURCE: Administrative Sites
Stipulation: No Surface Occupancy
Objective: To preclude surface occupancy and new surface disturbing activities within administrative areas.

The Staged Decision Process

The legally required, staged-decision process is designed to accommodate the tentative nature of oil and gas exploration and development. Exploration for oil and gas resources is costly and speculative. Firms must commit costly equipment, purchase a variety of land rights and use expensive environmental protection technologies to begin exploration for oil and gas. Driven by pressures to be efficient and minimize risk, the nature of the enterprise has evolved over decades into a form in which exploration and development requires long-term planning by many loosely associated, mutually dependent industries. There is no guarantee that the expensive commitment of exploratory resources will result in a discovery of oil or gas as only about 15 percent of exploratory wells drilled in the United States result in a paying discovery of oil or gas.

Consequently, companies or individuals pursuing oil and gas must be able to plan in advance to most efficiently use their exploratory resources. One tactic they rely on to stage commitments of their own resources is the purchase of public land leases. Developers want to know what lands are available for exploration and development and they want to be assured of continued future opportunities. Leasing of public lands is a way to do this.

However, those purchasing leases do not automatically or immediately drill exploratory wells on these leaseholds. In any given time period, exploration firms must match geologic characteristics with the commitment of technology, capital, available equipment, and market conditions in a decision to risk a drilling operation. As a result, Federal land leases are bought, relinquished, expire, and may be bought and sold again many times without ever being drilled upon. This demonstrates a major distinction between oil and gas leasing and other activities that are authorized by the Forest Service. Most activities are reasonably certain to proceed to development after the permit or contract is issued. Even though there is great uncertainty at the time of lease authorization as to whether a well will be drilled and, if so, when and where, the effects of a typical well in a given location can be estimated reliably on the basis of past experience.

The Federal government wants to respond to industry concerns, but must ensure that future activities will neither unduly harm the environment nor unduly interfere with other uses of these public lands. A regulatory framework has been created to meet industry's needs while protecting other resources. The regulations include staged permitting of oil and gas exploration and development. Those stages include public disclosure at the following decision points: (1) the determination of lands available for leasing, (2) the leasing specific lands decision, (3) Application for Permit to Drill, and (4) analysis of field development if production is established. The staged process is designed to minimize the risk of making a decision that could lead to undisclosed irreversible or irrevocable environmental impacts. Each decision is based on

environmental analysis and disclosure of the probable effects in accord with NEPA. Each decision is appealable to the responsible Federal agency.

The United State Supreme Court in Robertson v. Methow Valley Citizens Council, 104 L.Ed.2d 351 (1989), upheld the use of more than one stage of NEPA Compliance after a Forest Plan is issued. In the Methow Valley situation, there was a permit stage (which allowed no ground-disturbing activities) and a faster development plan stage that involved another NEPA process and decision by the Government before environmental effects would be experienced. This is very similar to the situation that is involved here.

Stage One – Lands Available for Leasing

The decision regarding lands available for leasing is based on disclosure and analysis provided in a "Leasing Analysis." No rights are granted by the government to other parties when the Leasing Analysis is completed and the decision described in 36 CFR 228.102(d) is made. This EIS was prepared to satisfy the requirements of NEPA for the Leasing Analysis.

The decision will identify which, if any, lands will be available for leasing. The Forest Plans will be amended, if necessary, at the time so that the decisions made on the basis of this EIS will be consistent with the Forest Plans.

State Two – Leasing Decisions for Specific Lands

The Leasing Reform Act also provides for consent by the Forest Service for the issuance of oil and gas leases for specific lands. The regulations implementing the Leasing Reform Act require the following before consent can be given for one or more leases to by issued by the BLM:

- verifying that oil and gas leasing on the specific lands has been adequately addressed in a NEPA document, and is consistent with the Forest Plans

- ensuring that conditions of surface occupancy identified in section 228.102(c)(1) are properly included as stipulations in resulting leases

- determining that operations and development could be allowed somewhere on each proposed lease, except where stipulations would prohibit all surface occupancy

Stage Three – Application for Permit to Drill

This document, and its Record of Decision, do not authorize any ground-disturbing activities. Subsequent to lease award, the activities will be proposed through an APD and SUPO submitted to the Forest Service for approval. The Forest Service will analyze environmental effects of the proposed operations and issue a decision document. The Forest Service decision to approve or not approve the SUPO is forwarded to the BLM for incorporation into their decision of whether of not to approve the APD.

If modification or changes in the APD are needed, based on drilling conditions encountered or some other unforeseen circumstance, the operator submits a Sundry Notice to the BLM for review and approval. If the change involves surfaced disturbance or potential affects on surface resources, a copy is forwarded to the Forest Service for approval or comment. Depending on the extent and nature of the change additional NEPA analysis may be necessary.

Stage Four – Field Development Plan

If economically recoverable quantities of oil and gas resources are found through exploratory drilling, industry may submit a field development plan after evaluation of the discovery well and available geologic information. The Forest Service in cooperation with the BLM would analyze the environmental effects associated with the proposed field development and identify reasonable and necessary mitigation measures. Specific well sites and access routes may not be known at the time the field development plan is analyzed in which case additional NEPA analysis tiered to the field development plan may be necessary once a specific well is proposed.

APPENDIX H

Noxious Weeds of the Wasatch-Cache National Forest

This appendix discusses the known locations of various noxious weeds (Utah and/or Wyoming) that are known to occur on the Wasatch-Cache National Forest. Other species may occur, but those listed in Table H-1 have been identified on the Forest and are discussed in greater detail below. Included are comments on a few other species that are not classified as noxious weeds by either one or both of the states, but that are of concern because of their status in adjacent States, potential to become state noxious weeds, or because of their poisonous or injurious characteristics. Table H-1 lists noxious weeds and their occurrence within the ecological subsections of the forest. Sections that follow discuss these noxious weeds by Management Areas.

Table H-1. Noxious weeds that are known to occur in the three ecological sections of the Wasatch-Cache National Forest (unless noted, all plants are both Utah and Wyoming Noxious Weeds)

Common Name	*Scientific Name*	Wasatch & Bear River Ranges	Stansbury Mountains	Uinta Mountains
Canada thistle	*Circium arvense*	X		X
Common burdock[1]	*Arctium minus*	X		
Dalmatian toadflax[1]	*Linaria dalmatica*	X		
Dyers woad	*Isatis tinctora*	X		X
Field bindweed, morning glory	*Convolvulus arvensis*	X		
Houndstongue[1]	*Cyonoglossum officinale*	X		
Knapweed, Diffuse	*Centaurea diffusa*	X		
Knapweed, Russian	*Centaurea repens*	X		
Knapweed, Spotted	*Centaurea maculosa*	X		X
Leafy spurge	*Euphorbia esula*	X		
Medusahead[2]	*Taeniatherum caput-medusae*	X		
Musk thistle	*Carduus nutans*	X		X
Salt Cedar[1]	*Tamarix spp.*	X		
Scotch thistle	*Onopordum acanthium*	X		
Whitetop	*Cardaria draba*	X	X	X
Yellow starthistle[2]	*Centaurea solstitalis*	X		

[1] Wyoming State Noxious Weed only
[2] Utah State Noxious Weed only

Noxious Weed Assessment by Management Area

Cache-Box Elder Management Area

This management area likely has the greatest variety and concentration of noxious weeds on the forest. The most common noxious weed in this management area is **dyers woad**. While most abundant along roadsides and travel ways, it extends away from these areas onto adjacent areas. It occurs at nearly all elevations in the Bear River Range and has been noted at the lower to mid elevations of the Wellsville Range. Estimated population sizes range from less than 0.1 acre to over 200 acres in Wellsville Canyon and over 650 acres in lower Logan Canyon. **Leafy spurge** has been found in both the Bear River and Wellsville Ranges. It has been inventoried in the Mount Naomi Wilderness and adjacent areas along South Canyon, High Creek, Cherry Creek and its tributaries, and City Creek. **Leafy spurge** occurs along the eastern slope on the Wellsville Range on Maple Bench and Coldwater Canyon, north to Three Mile Canyon. **Musk thistle** has been noted at two locations in Logan Canyon, near Wood Camp and along Bear Hollow. In addition, it has been found on the eastern portion of this management area and in the Bear Management Area at five locations within the North Rich cattle allotment. **Canada thistle** occurs primarily along streams throughout the management area, but mostly in the Bear River Range. **Hemlock** has been noted in Left Hand Fork Blacksmith Fork, Providence Canyon, Right Hand Fork, Franklin Basin, and Spawn Creek. **Dalmatian toadflax** has been noted in Cowley Canyon south of the Logan Canyon Highway. **Russian Knapweed** has been located in Logan Canyon near Beaver Mountain and spotted knapweed has been found in Mill Hollow. **Black Henbane** has been noted near Temple Fork and Saddle Creek Narrows.

Bear Management Area

Rich County to the east of this management area has a high concentration of noxious weeds and influences the occurrences of these species on the forest. The most commonly found weeds in Rich County, both on and off the Forest, include houndstongue, black henbane, Canada thistle, and musk thistle (Dewey 2000). Of the species found within the Bear Management Area, **Canada thistle** and **houndstongue** were the most common occurrences. **Musk thistle** while not as abundant was also present as were **dyers woad**, **poison hemlock**, **hoary cress**, and **black henbane**.

North Wasatch-Ogden Valley Management Area

Dyers woad is abundant on lands adjacent to the forest and is spreading onto the forest primarily along travel ways. **Whitetop** has been noted in lower Farmington Canyon, but likely occurs elsewhere. **Spotted knapweed** has been noted in Weber Canyon. It is not clear whether this population is on National Forest lands or on adjacent private lands, but it would be the highest priority for treatment.

Central Wasatch Management Area

Dyers woad is abundant on the lower elevations in this management area and is spreading up canyon travel ways. **Whitetop** has been noted in Red Butte Canyon. **Dalmatian toadflax** is abundant along the foothills and along travel ways in the canyons on the western portion of this management area, but has also been found at a site in Little Cottonwood Canyon on soils brought in for restoration work. In addition, **wand mullein**, which is not currently a Utah noxious weed, but which has the potential to be very invasive, has been found on this site. **Jointed goatgrass** has been noted in the drainage ditches along the lower portion of Big Cottonwood Canyon. More noxious weeds occur in this management area, but have not been inventoried by the forest.

Stansbury Management Area

Whitetop has been noted along many drainages in the Stansbury Mountains including, but not limited to North Willow, South Willow, Big Hollow, Barlow, Spring Creek, Round, Big Granite, Monument, and Chokecherry Canyons. Other species are likely to occur, but have not been inventoried.

Western Uintas Management Area

Dyers woad is beginning to expand into this management area from adjacent Utah. While it has only been noted at one location along Beaver Creek east of Kamas, it is on several sites south of Evanston where it has been identified near Carrot Hollow, Moffit East Fork, near Stillwater Campground and near the Bear River. **White top** has been noted in many of the same areas as well. **Canada thistle** is common throughout this management area, while **musk thistle** has been noted in Rileys Canyon, Smith-Morehouse, Nobletts, Swifts, and Left Hand Canyon as well as scattered locations on the north slope of the Uinta Mountains in this management area.

Eastern Uintas Management Area

Canada and musk thistle are common throughout this management area. In addition, **dyers woad** has been found near the East Fork Smiths Fork and Little Dry Creek. **Whitetop** has been noted near Henrys Fork and **spotted knapweed** has been found near the forest boundary south of Mountain View.

Source of Data:

Data were from field observations and maps produced in 1999 from Range Management Specialists across the forest. In addition, GIS map layers provided by Dr. Steven Dewey, Professor at Utah State University provided information, both on and off the Forest, for areas in Box Elder, Rich, and Cache Counties (Dewey 1997, Dewey 1999, and Dewey 2000).

APPENDIX I

Current Allotment Status and Allotment Status by Alternative

Table I-1 lists all open allotments on the Wasatch-Cache National Forest, their type (cattle, sheep, or sheep & cattle combined) and their current status as well as their proposed status by each alternative:

- o = open, grazed
- v = vacant (open, ungrazed)
- c = closed
- ah = allotments closed only if permits are voluntarily waived without preference (for the benefit of bighorn sheep habitat and disease prevention).

In addition, Figures I-1, I-2, I-3, and I-4 show where those allotments occur on the forest.

Allotment Name	Total Acres	Allotment Type	Current Status	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Stansbury Mountain Allotments										
Barlow Deadman	6,227	Cattle	v	c	c	v	v	v	v	v
Black Bunch	4,891	Cattle	o	o	o	o	o	o	o	o
Box Elder	7,853	Cattle	o	o	o	o	o	o	o	o
North Grantsville	4,986	Cattle	o	o	o	o	o	o	o	o
Rush Valley	10,365	Cattle	o	o	o	o	o	o	o	o
Skull Valley North	6,267	Sheep	o	o	o	o	o	o	o	o
Skull Valley South	7,157	Cattle	o	o	o	o	o	o	o	o
South Grantsville	5,518	Cattle	o	o	o	o	o	o	o	o
Bear River Range and Wasatch Range Allotments										
Arthur’s Fork	3,305	Sheep	o	o	o	o	o	o	o	o
Beaver Mountain	6,049	Sheep	o	o	o	o	o	o	o	o
Blacksmith Fork	551	Cattle	v	c	c	v	v	v	v	v
Blake Hollow	3,990	Sheep	o	o	o	o	o	o	o	o
Blind Hollow	6,758	Sheep	o	o	o	o	o	o	o	o
Boulder Mountain	6,628	Sheep	o	o	o	o	o	o	o	o
Bountiful	5,609	Sheep	o	o	o	o	o	o	o	o
Buck Springs	7,082	Sheep	o	o	o	o	o	o	o	o
Bug Lake	7,701	Sheep	o	o	o	o	o	o	o	o
Causey Creek	2,854	Sheep	o	o	o	o	o	o	o	o
Clegg	899	Sheep	v	c	c	v	v	v	v	c
Cottonwood	12,125	Sheep	o	o	o	o	o	o	o	o
Cowley Canyon	3,713	Sheep	o	o	o	o	o	o	o	o
Crawford Frazier	7,255	Sheep	o	o	o	o	o	o	o	o

Allotment Name	Total Acres	Allotment Type	Current Status	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Dairy Ridge	1,988	Sheep	o	o	o	o	o	o	o	o
Davenport	328	Sheep	o	o	o	o	o	o	o	o
Deep Creek	2,761	Sheep	o	o	o	o	o	o	o	o
Dry Bread	1,907	Sheep	o	o	o	o	o	o	o	o
Dry Creek	163	Cattle	o	o	o	o	o	o	o	o
Elk Hollow	4,932	Sheep	o	o	o	o	o	o	o	o
Elk Valley	856	Sheep	o	o	o	o	o	o	o	o
Elk Valley - Saddle Creek	2,663	s&c	o	o	o	o	o	o	o	o
Ephraim's Grave	3,557	Sheep	o	o	o	o	o	o	o	o
Four Mile	501	s&c	o	o	o	o	o	o	o	o
Hardscrabble	318	Sheep	v	c	c	v	v	v	v	c
High Creek	12,371	Cattle	o	o	o	o	o	o	o	o
Little Bear	9,900	Sheep	o	o	o	o	o	o	o	o
Little Monte	4,101	Sheep	o	o	o	o	o	o	o	o
Logan Canyon	14,707	Cattle	o	o	o	o	o	o	o	o
Long Hollow	5,407	Sheep	o	o	o	o	o	o	o	o
Maple Bench	839	Cattle	o	o	o	o	o	o	o	o
Mill Canyon	730	Sheep	v	c	c	v	v	v	v	c
Millville	4,552	Cattle	o	o	o	o	o	o	o	o
Morgan County	11,509	Sheep	o	o	o	o	o	o	o	o
North Monte	42	Sheep	o	o	o	o	o	o	o	o
North Randolph	8,897	Cattle	o	o	o	o	o	o	o	o
North Rich	27,489	Cattle	o	o	o	o	o	o	o	o
Pete's Hollow	3,153	Sheep	v	c	c	v	v	v	v	v
Providence	9,598	Cattle	o	o	o	o	o	o	o	o
Public Grove	6,232	Cattle	o	o	o	o	o	o	o	o
Red Wells-Rock Creek	16,642	Sheep	o	o	o	o	o	o	o	o
Ricks Steel	5,975	Sheep	o	o	o	o	o	o	o	o
Saddle Creek	4,104	Cattle	o	o	o	o	o	o	o	o
Shingle Mill	286	Sheep	v	c	c	v	v	v	v	c
Smithfield	6,033	Cattle	o	o	o	o	o	o	o	o
South Cache	19,090	Cattle	o	o	o	o	o	o	o	o
South Cottonwood	156	Sheep	o	o	o	o	o	o	o	o
South Randolph	11,831	Cattle	o	o	o	o	o	o	o	o
Strawberry Valley	1,154	Cattle	o	o	o	o	o	o	o	o
Swan Peak	9,978	Sheep	o	o	o	o	o	o	o	o
Three Mile	1,741	Cattle	o	o	o	o	o	o	o	o
White Rock	9,536	Sheep	o	o	o	o	o	o	o	o
Woodruff	5,630	Cattle	o	o	o	o	o	o	o	o
Wright	5,903	Sheep	v	c	c	v	v	v	v	c
Uinta Mountains Allotments										
Beaver Creek	16,034	Cattle	o	o	o	o	o	o	o	o

Allotment Name	Total Acres	Allotment Type	Current Status	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blacks Fork	7,707	Cattle	o	o	o	o	o	o	o	o
Burnt Fork	18,800	Cattle	o	o	o	o	o	o	o	o
Burro Peaks	19,102	Sheep	v	c	c	v	v	c	c	c
Curry	941	Cattle	o	o	o	o	o	o	o	o
East Fork Bear River	20,329	Cattle	o	o	o	o	o	o	o	ah
East Fork Blacks Fork	25,976	Sheep	o	o	o	o	o	o	o	ah
East Fork Smiths Fork	18,800	Sheep	o	o	o	o	o	o	o	o
Gilbert Creek	15,551	Cattle	o	o	o	o	o	o	o	o
Gilbert Peak	12,468	Sheep	o	ah	ah	o	o	o	ah	ah
Gold Hill	8,193	Sheep	o	o	o	o	o	o	o	o
Henrys Fork - Hessie Lake	13,932	Sheep	o	ah	ah	o	o	o	ah	ah
Humpy Creek	2,960	Sheep	o	o	o	o	o	o	o	o
Kamas Valley	54,894	Cattle	o	o	o	o	o	o	o	o
Larson	9,462	Sheep	o	o	o	o	o	o	o	o
Little West Fork Blacks Fork	7,693	Sheep	o	o	o	o	o	o	o	o
Luke-Lym	3,256	Sheep	o	o	o	o	o	o	o	o
Lyman Lake	2,978	Sheep	o	o	o	o	o	o	o	o
Meadow Creek	2,487	Sheep	o	o	o	o	o	o	o	o
Middle Fork Blacks Fork	12,591	Sheep	o	o	o	o	o	o	o	o
Mill Creek	9,496	Sheep	o	o	o	o	o	o	o	o
Moffit	2,874	Sheep	o	o	o	o	o	o	o	o
Mount Elizabeth #2	6,053	Sheep	o	o	o	o	o	o	o	o
Poison Mountain	9,688	Cattle	o	o	o	o	o	o	o	o
Red Castle	12,293	Sheep	o	ah	ah	o	o	o	ah	ah
Red Mountain	34,492	Cattle	o	o	o	o	o	o	o	o
Smith - Morehouse	15,276	Sheep	o	c	c	v	v	v	v	v
Stillwater	26,625	Sheep	o	o	o	o	o	o	o	ah
Thompson Peak	13,672	Sheep	v	c	c	v	v	c	c	c
Walker	602	Cattle	o	o	o	o	o	o	o	o
Weber River	28,980	Cattle	o	o	o	o	o	o	o	o
West Beaver	11,135	Sheep	v	c	c	v	v	c	c	c
West Fork Bear River	4,294	Sheep	o	o	o	o	o	o	o	o
West Fork Blacks Fork	17,923	Sheep	o	o	o	o	o	o	o	ah
West Fork Smiths Fork	36,349	Cattle	o	o	o	o	o	o	o	o
Woodpile	4,932	Sheep	o	o	o	o	o	o	o	o

Figure I-1. Currently open allotments in the Bear River and Wellsville Ranges (Overthrust Mountains) of the Wasatch-Cache National Forest in northern Utah

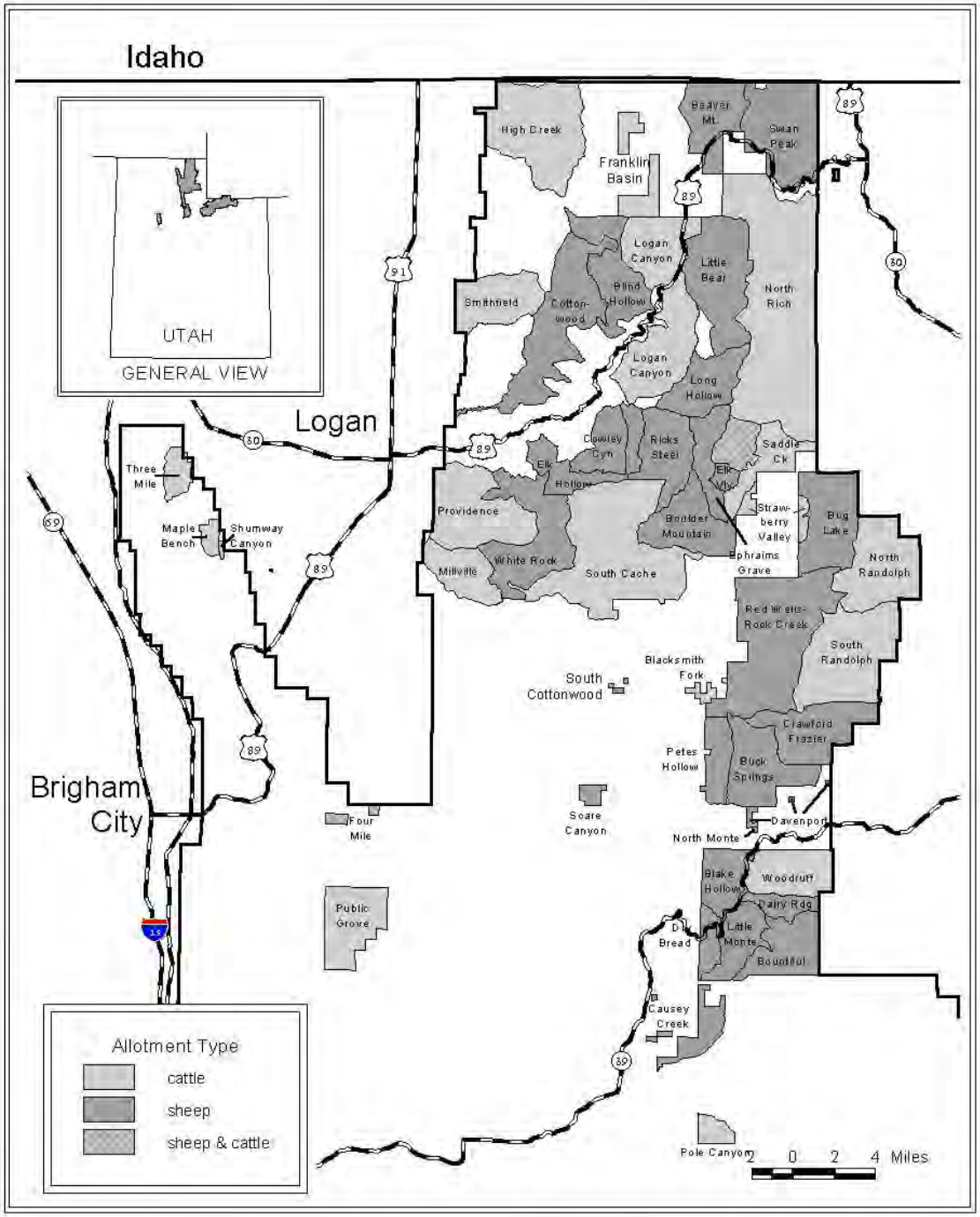


Figure I-2. Currently open allotments in the Wasatch Range (Overthrust Mountains) of the Wasatch-Cache National Forest in northern Utah

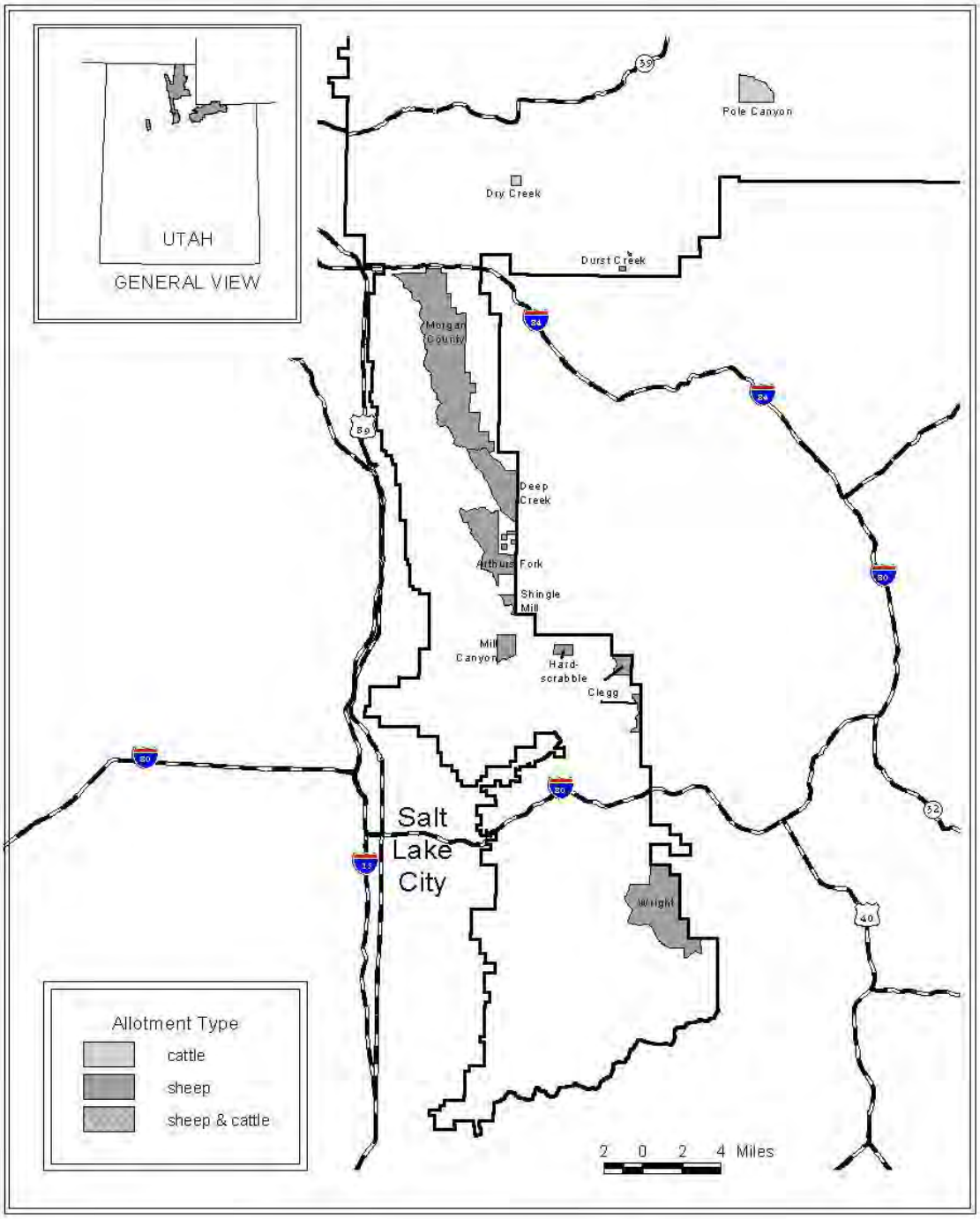


Figure I-3. Currently open allotments in the Stansbury Mountains (Bonneville Basin) of the Wasatch-Cache National Forest in northern Utah

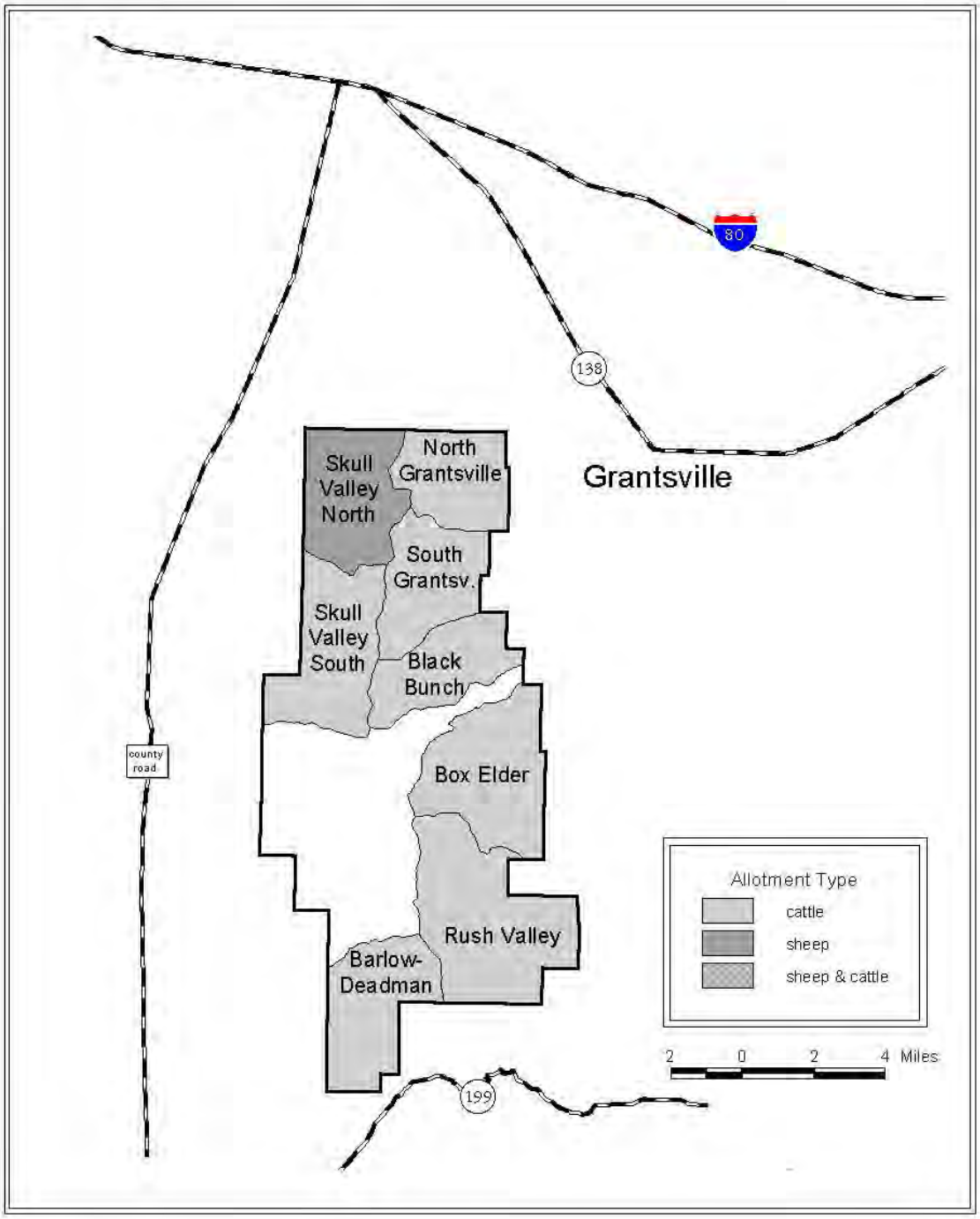
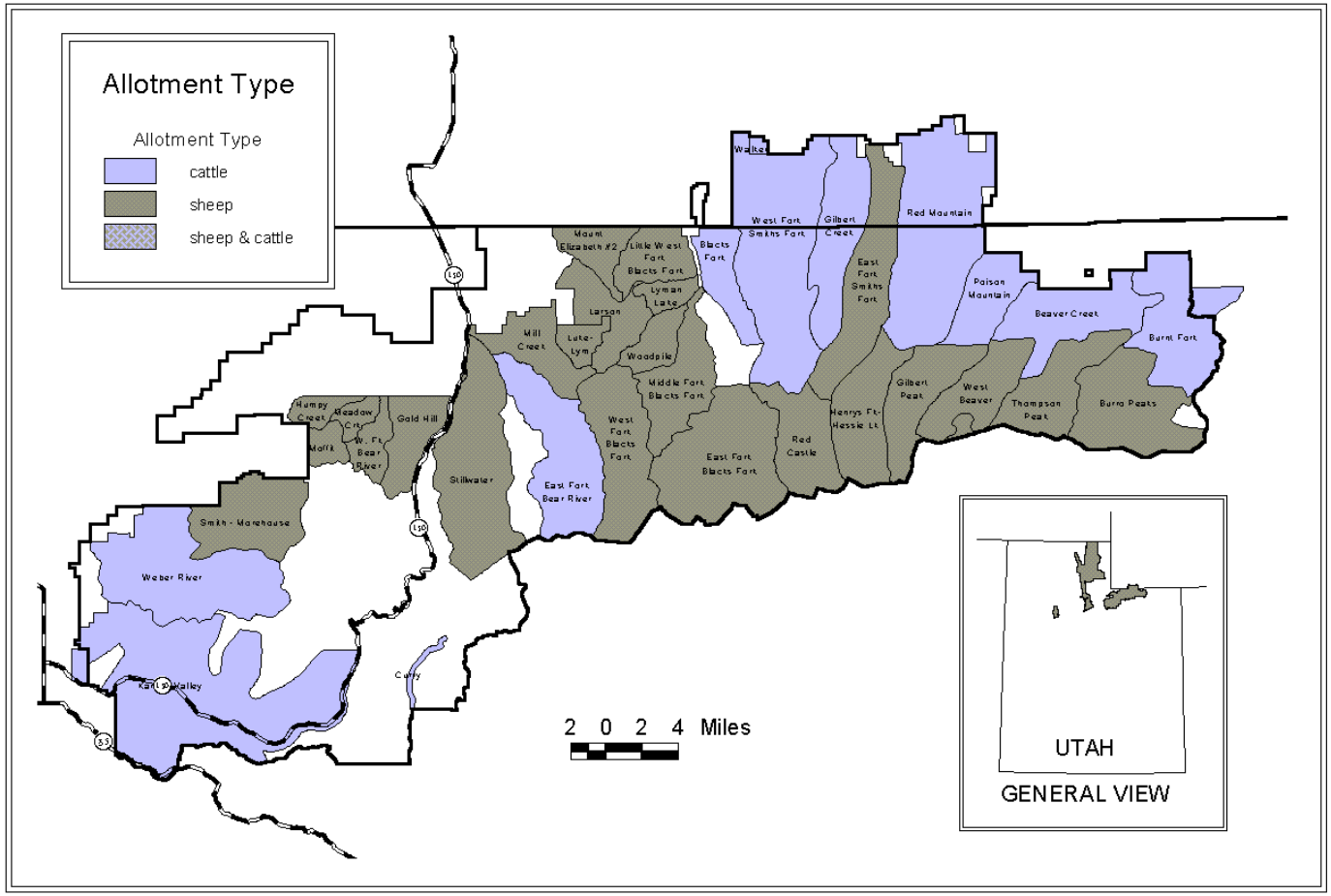


Figure I-4. Currently open allotments in the Uinta Mountains of the Wasatch-Cache National Forest in northeastern Utah



APPENDIX J

Management Indicator Species/Management Indicator Communities

Introduction

Management indicators are used to assess the effects of a management activity on wildlife. One of the factors considered when selecting management indicator species (MIS) is their close tie to the communities they represent. The communities being monitored through MIS are where the majority of management actions will take place.

The general guidance and criteria for selecting MIS are contained in 36CFR219.19(a) and in the Forest Service Manual 2621.1. The 1985 Forest Plan includes two categories in the MIS discussion. These are Ecological Indicators that are intended to show the effects of management on the ecosystem, and High Interest Species that identify species of economic importance (such as big game) and species of concern (such as Federally listed species, Forest Service sensitive species and other species at risk). The 1985 Plan includes 14 Ecological Indicators to monitor 13 vegetation types or age classes within a vegetation type, rivers and lakes. There are eight High Interest Species, including 3 big game animals, 2 fish species, and 3 species of concern.

Updating MIS was recommended in the Preliminary Analysis of the Management Situation (USDA Forest Service 1999a). The Preliminary Analysis of the Management Situation proposed to use neo-tropical migratory birds for the majority of MIS. This was done in the DEIS for the revised Forest Plan. In reviewing the DEIS it was decided that neo-tropical migrants would not be suitable as MIS because they spend much of their time off on the Forest. Also, in reviewing USGS Breeding Bird surveys USGS always notes that on an individual site (survey route) variances may not be valid. For valid variances one must go to a larger area and that is provided on a statewide analysis. When the Forest Plan allows an average of 500 acres of timber to be harvested annually across the Forest a statewide analysis of the species would not show locations of increases or decreases in any frame of reference to indicate what Forest management practices might be having.

Selection of Management Indicators

The following criteria were used in selecting MIS:

1. MIS must have a strong (but not exclusive) affinity for the habitat type.
2. The habitat type is key habitat in the life cycle of the MIS.
3. The MIS is sensitive to change.

4. The MIS is relatively easy to monitor, i.e., high visibility and in adequate numbers.
5. The MIS is somewhat representative of all species that use the habitat type.
6. The MIS is, for the most part, a year round resident on the forest.

36 CFR 219.19(a)(1) states, "…the following categories shall be represented where appropriate."

1. Endangered and threatened plant and animal species. Endangered and threatened species have not been selected as MIS because none present on the Wasatch-Cache are well distributed across the Forest in a fashion that indicates how management activities are affecting the population as a whole.

2. Species with special habitat needs that may be influenced significantly by planned management programs. Again, these are usually inherently rare species and in most cases narrow endemics that are considered on a case-by-case basis for individual projects.

3. Species commonly hunted, fished, or trapped. Big game species are not used because they are very mobile, have relatively weak affinity for a given vegetation type, are somewhat insensitive to alteration of local habitat and their numbers are more controlled by State hunting regulations. Three species from this group have been selected as MIS. Cutthroat trout will be monitored by condition as well as estimated population. Snowshoe hares are not heavily hunted and beaver are in general not heavily trapped. More discussion follows.

4. Non-game species of special interest. The goshawk has been selected from this group and is discussed below.

5. Other. The CFR actually states, "…and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities…" The Forest has not chosen any MIS that fall into this category although vegetation is monitored through the range program and in connection with properly functioning condition and historic range of variability.

Some revision participants suggested that large predators should be used as management indicator species. They were not chosen as MIS because they did not meet criteria 1-MIS must have a strong (but not exclusive) affinity for the habitat type; 2- The habitat type is key habitat in the life cycle of the MIS; and 4-The MIS is relatively easy to monitor, i.e., high visibility and in adequate numbers, above.

It must be realized that almost every project that is implemented will benefit some wildlife species and be detrimental to others. In considering the effects on MIS we include how much habitat is available, how that habitat is spread across the Forest, and are we operating in or moving toward properly functioning condition (PFC) and the historic range of variability (HRV).

Following the above criteria, Table MI-1 shows the disposition of the 22 MIS identified in the 1985 Forest Plan.

Table MI-1. Management Indicator Species from the 1985 Plan and Disposition In Revised Plan

MIS	Disposition In New Forest Plan
Ecological Indicators	
Gray Jay	Species is not spread across the Forest. USGS Breeding Bird Survey results for Utah indicate the Uinta Mountains is the only area where there is a good population in the state.
Red-breasted nuthatch	Not a yearlong resident.
Hairy woodpecker	Replaced by the goshawk.
Pine siskin	Not a yearlong resident.
Red-naped sapsucker	Not a yearlong resident.
Warbling vireo	Not a yearlong resident.
Mountain bluebird	Not a yearlong resident.
Water pipit	Not a yearlong resident.
MacGillivray's warbler	Not a yearlong resident.
Green-tailed towhee	Not a yearlong resident.
Black-throated gray warbler	Not a yearlong resident.
Vesper sparrow	Not a yearlong resident.
Macroinvertebrates	The cutthroat trout provide duplication on monitoring of aquatic habitat. It is also significantly less expensive and baselines are generally available.
Cutthroat trout	Carried over into new plan.
Species of Special Interest	
Mule deer	Generally very mobile, have relatively weak affinity for any given vegetation type, are somewhat insensitive to alteration of local habitat, and numbers are controlled more by State hunting regulations and number of permits issued.
Elk	Same as mule deer above.
Moose	Same as mule deer above.
Bonneville cutthroat trout	Carried over into new plan.
Colorado River cutthroat trout	Carried over into new plan.
Pine marten	Being high on the food chain it's population are subject to changes in prey species populations. Monitoring is costly.
Peregrine falcon	Habitat is not in areas with high management opportunities and would not indicate what management in doing.
Bald eagle	Same as peregrine falcon above.

Table MI-2 shows the disposition of MIS identified in the DEIS and Proposed Plan.

Table MI-2. Management Indicators Identified in DEIS and Proposed Plan and Disposition Into FEIS and Revised Plan.

MIS	Disposition Between Draft and Final
MacGillivray's warbler	Not a yearlong resident.
Goshawk	Carried into final.
Warbling vireo	Not a yearlong resident.
Snowshoe hare	Carried into final.
Ruby-crowned kinglet	Not a yearlong resident.
Vesper sparrow	Not a yearlong resident.
Brewer's sparrow	Not a yearlong resident.
Cutthroat trout (Bonneville and Colorado River)	Carried into final.

Selected Management Indicator Species

Table MI-3 shows the management indicator species that will be used on the Forest.

Table MI-3. Management Indicator Species/Management Indicator Communities

Management Indicator	Associated Vegetation Community
Goshawk *Accipiter gentilis*	Aspen, Conifer, Mixed Conifer
Snowshoe Hare *Lepus americanus*	Pole/Sapling Aspen, Conifer, and Mixed Conifer
Beaver Castor canadensis	Riparian
Cutthroat Trout *Oncorhynchus clarki pleuriticus* *Oncorhynchus clarki utah*	Aquatic

Goshawk – aspen, conifer and mixed conifer. The goshawk is a forest habitat generalist that uses a wide variety of forest ages, structural conditions, and successional stages. The goshawk preys on large-to-medium-sized birds and mammals, which it captures on the ground, in trees, or in the air. Three components of a goshawk's home range have been identified: nest area (approximately 30 acres), post fledging-family area (approximately 420 acres), and foraging area (approximately 5,400 acres). The species nests in a wide variety of forest types including aspen, coniferous, and mixed conifer forests. It typically nests in mature and old-growth forests (Nature Conservancy, 1999).

Snowshoe hare -- pole/sapling aspen, conifer and mixed conifer. In the Rockies and westward, hares mainly use coniferous forests. They are predominately associated with forests that have a well-developed understory that provides protection from predation and supplies them

with food. Such habitat structure is common in early seral stages but may also occur in coniferous forests with mature but relatively open overstories (Ruggiero, 2000).

Beaver – riparian. The beaver occurs throughout most of North America and is fairly common in Utah. It is found in permanent slow moving streams, ponds, small lakes, and reservoirs. On the Wasatch-Cache National Forest, the Uinta Mountains are classed as "substantial value" habitat and the rest of the Forest as "critical value" or "high value habitat as indicated on Gap Analysis maps.

Bonneville and Colorado River cutthroat trout – aquatic. The number of fish in a reach of stream is not considered a good monitoring factor because some streams are stocked and most streams are fished. Number fluctuations due to stocking and angling make it difficult, at best, to determine the effects of forest management activities on the population. Cutthroat trout (Bonneville or Colorado River, depending on the drainage) will be used as MIS using a "condition" factor as the monitoring tool (see monitoring below).

Vegetation types not monitored by MIS

There are two vegetation types not covered by MIS. The first is the sage/grasslands of which there are 189,600 acres across the Forest. The species which best fit the criteria for sage/grasslands is the sage grouse (*Centrocercus urophasianus*). Since the sage grouse is not spread across the Forest in a manner that it will be able to indicate the effects of management in the sage/grasslands across the Forest it was determined not to fit the criteria in a manner to be acceptable as an MIS. With proposed projects in used habitat the species can be used on a project to monitor the effects of the individual project. This would be determined in a site-specific NEPA document. The sage/grassland vegetation type will be monitored to track changes in amounts and age classes, as age classes are mapped.

The other vegetation type not covered is oak/maple (mapped separately in the GIS layer with oak covering 90,800 acres and maple covering 14,600 acres). Work in the oak/maple is planned in the form of fuels reduction along the urban interface. This is planned to be mechanical and would serve to give better age class diversity in the type. As with the sage/grassland, oak/maple will be monitored as to assess changes in amounts and age classes, as age classes are mapped.

Habitat Availability

Table MI-4 shows the acres within the GIS vegetation layers that represent the habitats represented by each MI species. Maps showing how each of these habitats is spread across the Forest are in Appendix A of this paper.

Table MI-4 Habitat Availability

Species	Habitat Represented	GIS Veg Layer Designation	Acres
Goshawk	Aspen/Mixed Conifer	AC, AS, CA, LP, MC, DF [1]	506,200
Snowshoe Hare	Pole/Sapling Conifer (Form 2+3 where available)	AC, CA, LP, MC, DF, SF [1]	556,800
Beaver	Riparian	WM, WI, BH	24,800
Cutthroat Trout	Aquatic	Aquatic	Refer to Chapter 3 Topic 2 of the FEIS[2]

[1] These are total acres not broken out by age class. It is realized that goshawks prefer mature and old age classes and showshoe hares prefer younger age classes or vegetative structure that has an open canopy that allows uderstory growth.
[2] There are approximately 640 miles of perennial streams on the Wasatch-Cache. Not all have cutthroat trout in them. The aquatic section of Chapter 3 better discusses waters having or not having cutthroat trout.

WM – Wet Meadow (16,900 acres)
WI – Willow (4,400 acres)
BH – Bottomland Hardwood (3,500 acres)
AC – Aspen/Conifer (55,800 acres)
CA – Conifer/Aspen (47,000 acres)
AS – Aspen (102,800 acres)
MC – Mixed Conifer (151,700 acres)
DF – Douglas Fir (87,600 acres)
SF – Spruce/Fir (153,400 acres)
LP – Lodgepole Pine (61,300 acres)

The following figures, at the end of this report, show how the vegetation types for each terrestrial species are spread across the Forest. Also included are figures showing the sage/grassland and oak/maple distribution:

Figure 1 Goshawk.
Figure 2 Snowshoe Hare.
Figure 3 Beaver.
Figure 4 Sage/Grassland.
Figure 5 Oak/Maple.

Population Information and Needs

Goshawk

The Forest has been monitoring goshawks territory occupancy since the Utah Forest Plan amendment in 1999. Monitoring results for different parts of the Wasatch-Cache are shown in Table MI-5.

Table MI-5 Goshawk Territory Occupancy

	Territories				Monitored				Active			
	'99	'00	'01	'02	'99	'00	'01	'02	'99	'00	'01	'02
Kamas/Evanston/Mt.View	21	22	22	22	12	22	18	22	4	2	6	6
Ogden/Logan	7	8	11	11	7	8	11	11	2	4	4	6
Salt Lake	1	1	1	1	1	1	1	1	1	1	1	1

Snowshoe Hare

In Utah a study was done in the Bear River Range on the Wasatch-Cache where snowshoe hare densities were determined in different vegetation types (Wolfe, 1982). Data included:

Aspen – sprce understory	0.01	hares/hectare	(.02	hares/acre)	
Aspen – dense understory	0.22	"	(.54	"	)
Aspen-conifer edge	0.17	"	(.42	"	)
Douglas fir	0.57	"	(1.41	"	)
Subalpine fir	0.99	"	(2.45	"	)
Engelmann spruce	0.10	"	(.10	"	)

Dennis Austin of the Utah Division of Wildlife Resources has been doing track and pellet transects in the Cache Wildlife Management Unit, North Amazon Basin since 1998. His findings are shown in Tables MI-6 and 7.

Table MI-6 Snowshoe Hare Track Counts
Accomplished in January and February

Snowshoe Hare Track Count	1998	1999	2000	2001	2002
	111(1)[1]	255(1)	054(0)	064(0)	051(0)

[1] Number in ( ) indicates actual number of animals observed when transect was being read.

Table MI-7 Snowshoe Hare Pellets Counted per 100 m^2
Accomplished in July

Plot	1999	2000	2001	2002
1	008	013	021	114
2	082	006	101	1327
3	030	005	107	329
4	071	015	022	515
5	109	030	131	495
6	079	007	031	326
7	059	029	228	414
8	177	033	044	651
9	078	130	077	330

10	247	027	226	1128
Total	940	295	988	5629
Mean	94.0	29.5	98.8	562.9
Standard Deviation	70.2	36.9	77.5	381.0
11[1]	ND	ND	203	456

[1] Adjacent to Plot 10, but cleared of dead under brush after the 2001 count.

Mr. Austin feels that the summer pellet counts are much more reliable than the winter track counts. The large jump in the 2002 pellet counts definitely coincides with an increase hare population although it is to early to speculate on the cause of this jump.

Information for the Uinta Mountains and Wasatch Mountains is not presently available. A baseline will be established using pellet counts. The same protocol will be used across the Forest.

As the database is built, consideration must be taken for the cyclic nature of snowshoe hares. As described in Ruggiero (1999), cycles can vary by one of four scenarios. Data from local areas would determine how these cycles run for that area.

Beaver

At the present time the Forest has no information on beaver populations on the Forest. The Utah Furbearer Harvest Report, 1998-1999 indicates that statewide the number of trappers increased by 36% in 1998-1999 but harvest was lower than expected although up 2% from the previous season. Beaver harvested per trapper decreased 25% from the previous season but was still 6% above the long-term average. This indicates that beaver are doing well in the state.

Harvest information is not the most reliable source to gain information of beaver populations. The monitoring schedule will be set up to get population information across the Forest in the most expedient timeframes possible.

Bonneville and Colorado River Cutthroat Trout

Most streams on the Wasatch-Cache National Forest have been surveyed for fish over the past 10 years. This information will be summarized and comparisons made as the individual 4th level HUC are surveys as identified in the monitoring section of the Forest Plan.

Survey Protocol

Goshawks

The Forest has been monitoring goshawk territory occupancy for several years. Protocol calls for annual monitoring of 50% of known territories or all territories if there are less than 20. The acceptable range of change is less than a 20% decline in territory occupancy over a 3-year period.

Snowshoe Hare

Monitoring transects will be set up on the Bear River Range, the Uinta Mountains and the Wasatch Range. Protocols are being investigated with the Utah Division of Wildlife Resources to determine the best for the Wasatch-Cache. McKelvey, et.al. (2002) and Krebs et.al. (2001) are the latest literature found on snowshoe hare transects and population density estimates. Plans are to have a pellet group protocol where transects are read in July. Transects will be read annually at least until a baseline is established. Then a proper timing interval will be established on how often transects will be read.

Beaver

Beaver will be monitored by surveying selected streams in the 4th order HUCs (hydrologic units) on the Forest. This can be done from the ground or the air (Hay 1958). Selected streams will be surveyed annually at least until a baseline is established. Then a proper timing interval will be established on how often transects will be read. Stream selection and protocols will be coordinated with the Utah Division of Wildlife Resources so that we can establish transects that will benefit both agencies in our management responsibilities.

Cutthroat Trout

The relationship between length and weight of fish has been studied biologically and the length-weight relationship is used from a purely academic view of growth. The coefficient of condition (K) is found by dividing the weight (W) by the length cubed (L^3), or $K=W/L^3$ (Lagler, 1956). This technique has the advantage that data on fish from years past can be used to generate a baseline from which to analyze data collected in the future. The data is automatically collected as stream surveys are accomplished. Aquatic biologists have a schedule for surveys across the Forest on a regular basis.

Figure 1

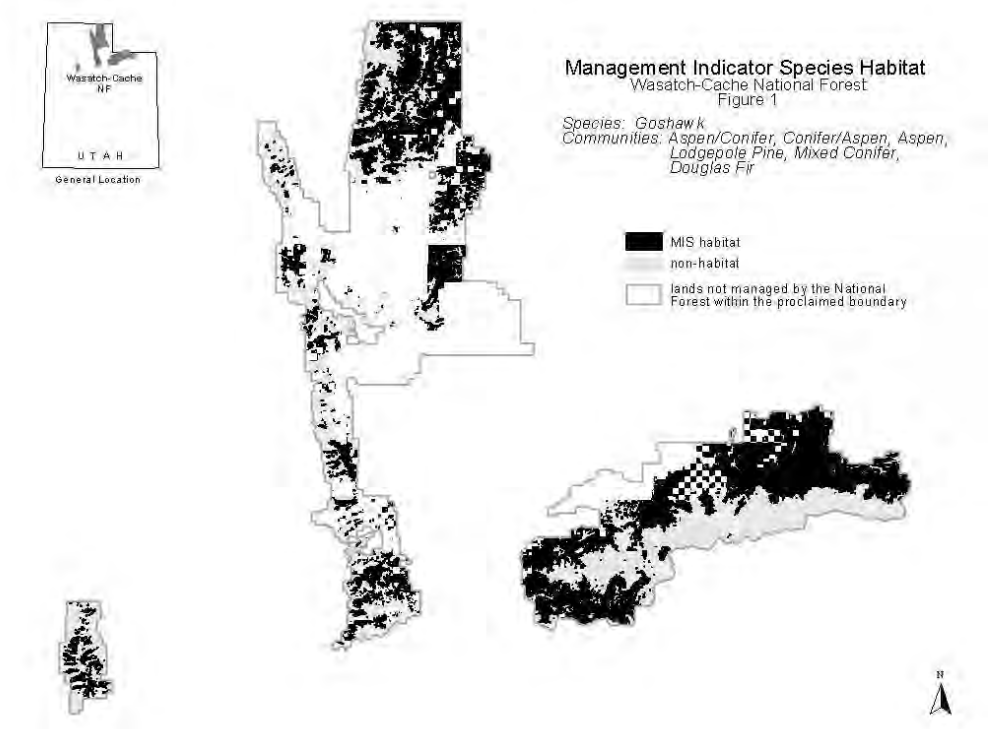


Figure 2

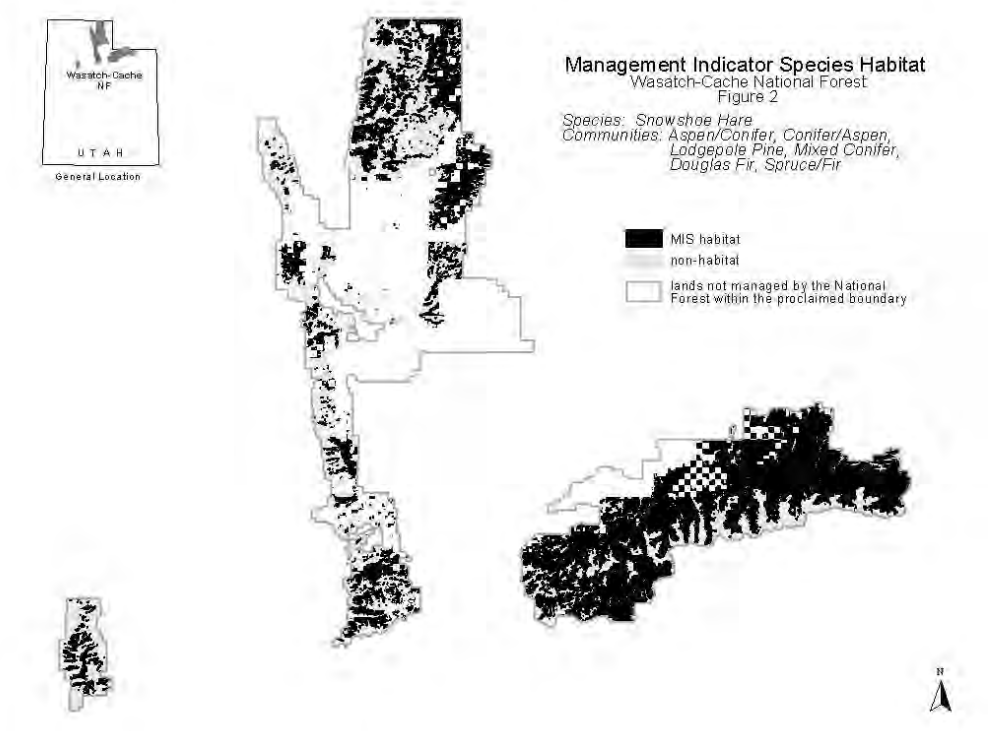


Figure 3

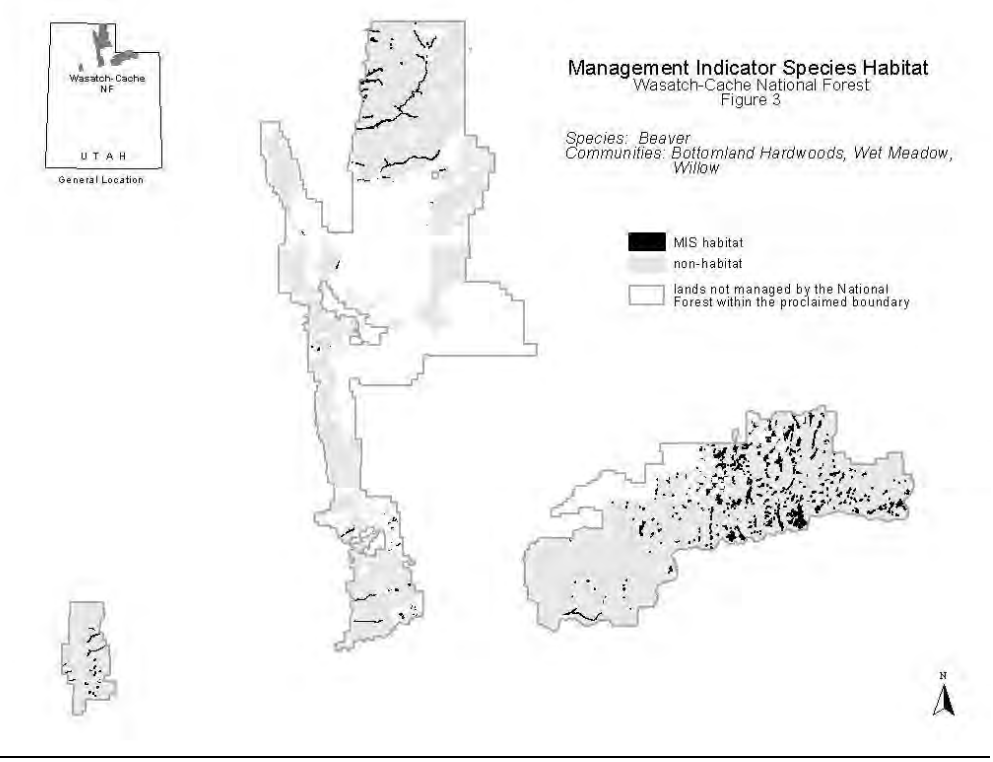


Figure 4

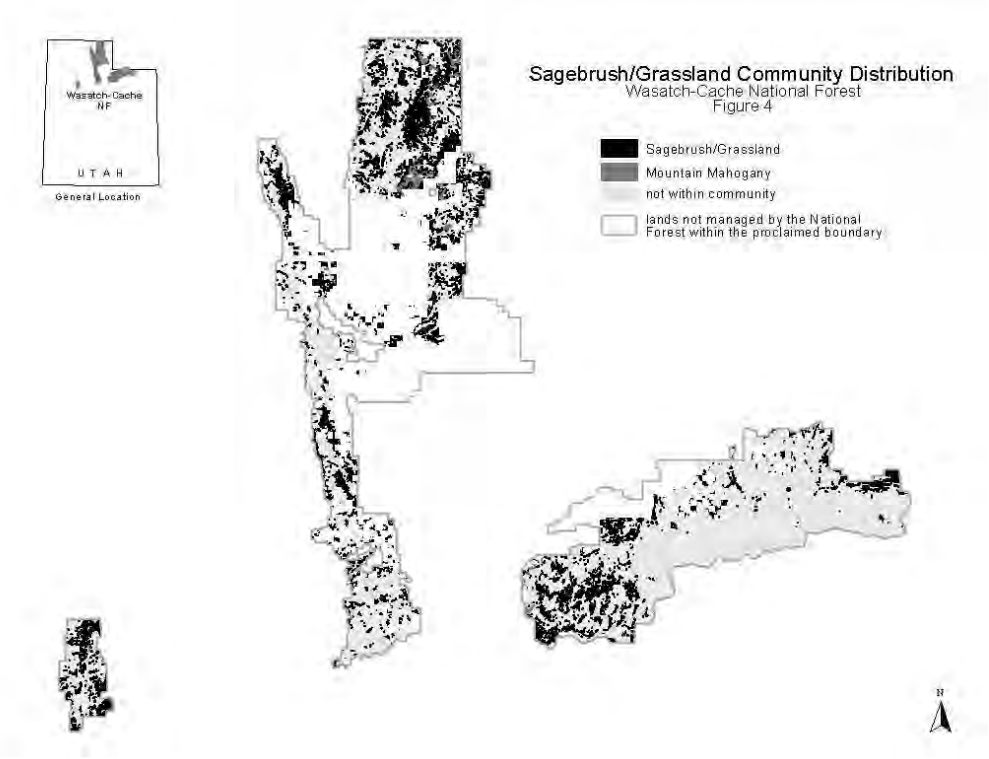
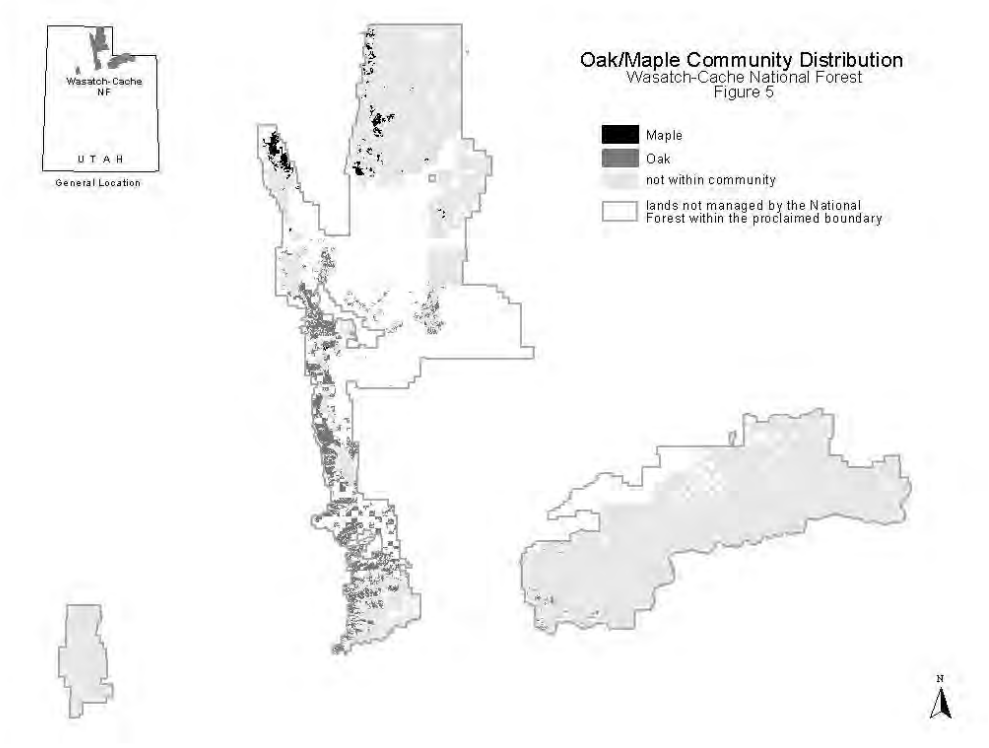
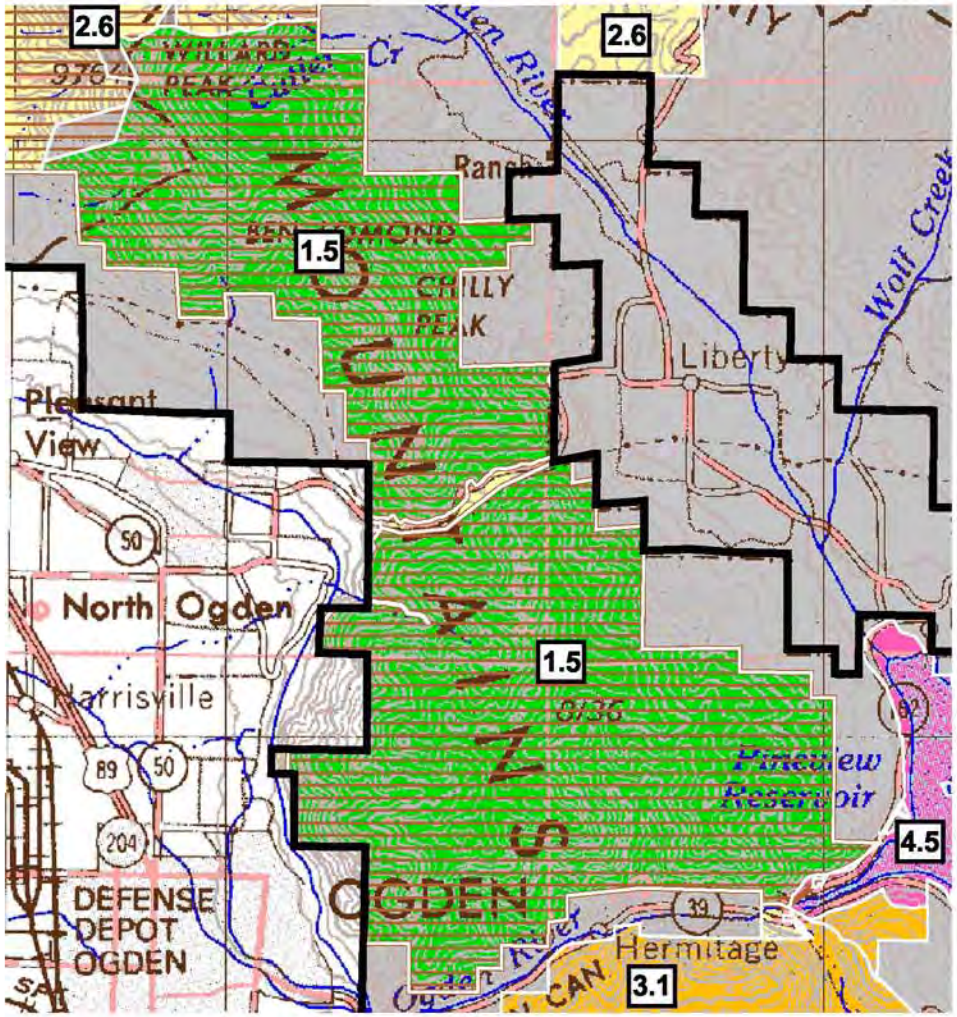


Figure 5


Oak/Maple Community Distribution
Wasatch-Cache National Forest
Figure 5
Maple
Oak
not within community
lands not managed by the National Forest within the proclaimed boundary
Wasatch-Cache NF
U T A H
General Location
N

Alternative 1 was modified in response to comments on the DEIS. This map inset *replaces* the same areas on the Alternative 1 Management Prescriptions Map.

A



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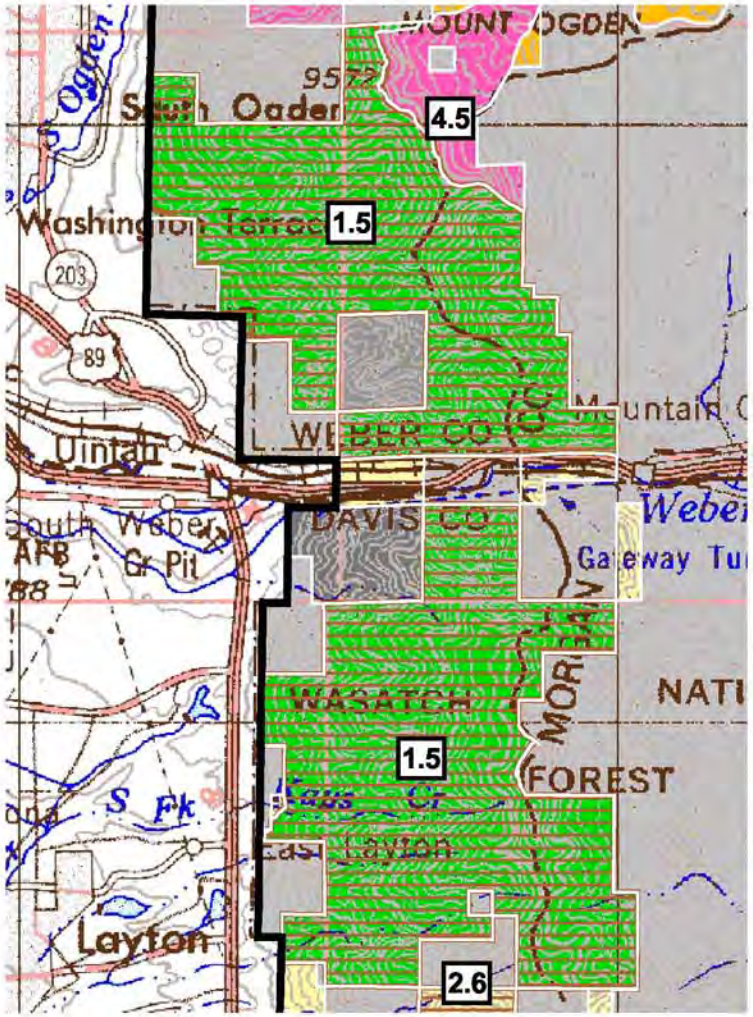

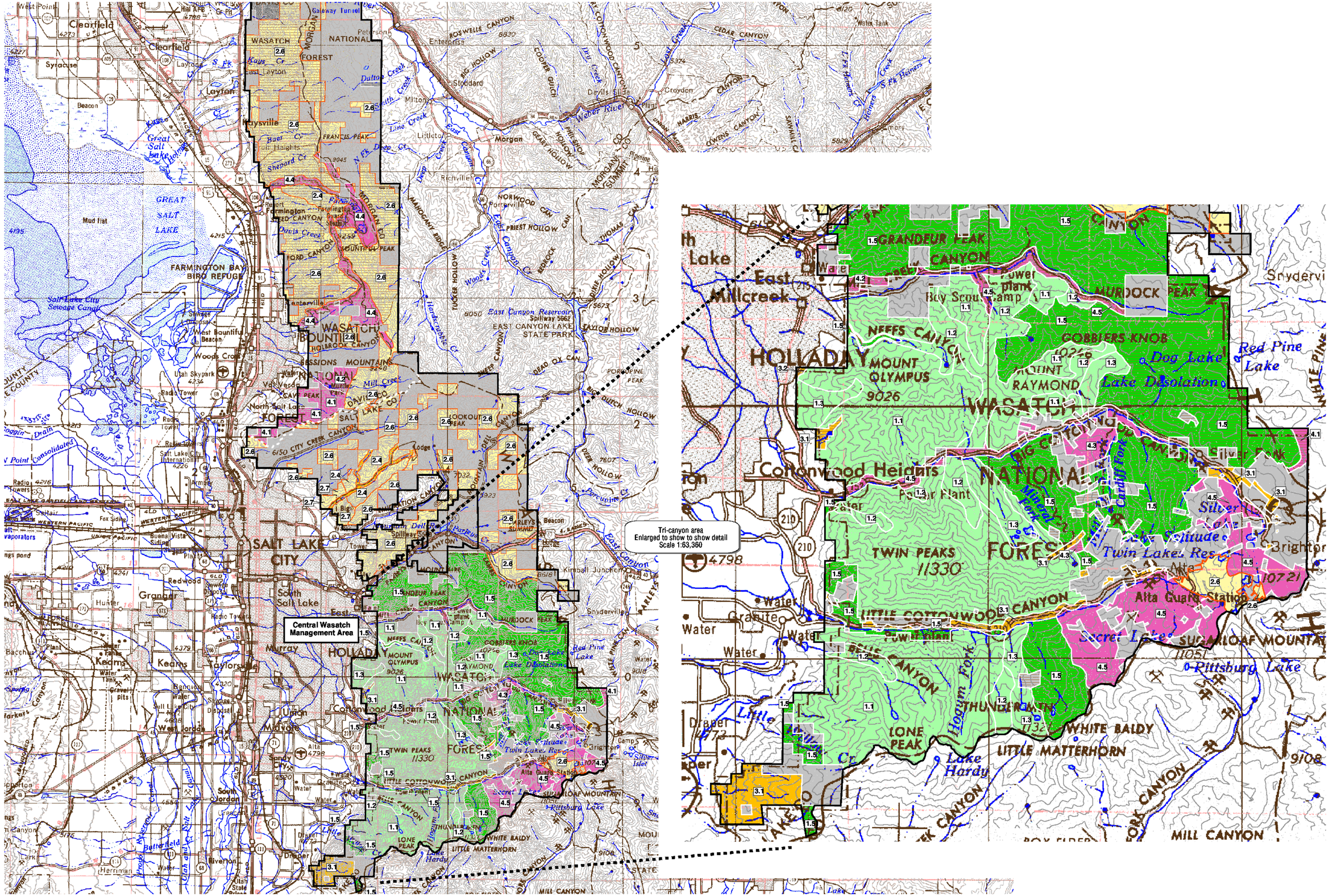

Tri-canyon area
Enlarged to show to show detail
Scale 1:63,360

Central Wasatch Management Area

May 2001

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 1
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*
- *Management Areas*

3 0 3 Miles

Scale 1:126,720

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For more information, contact:

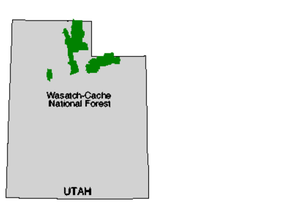
GIS Coordinator
Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3944

Cache - Box Elder Management Area

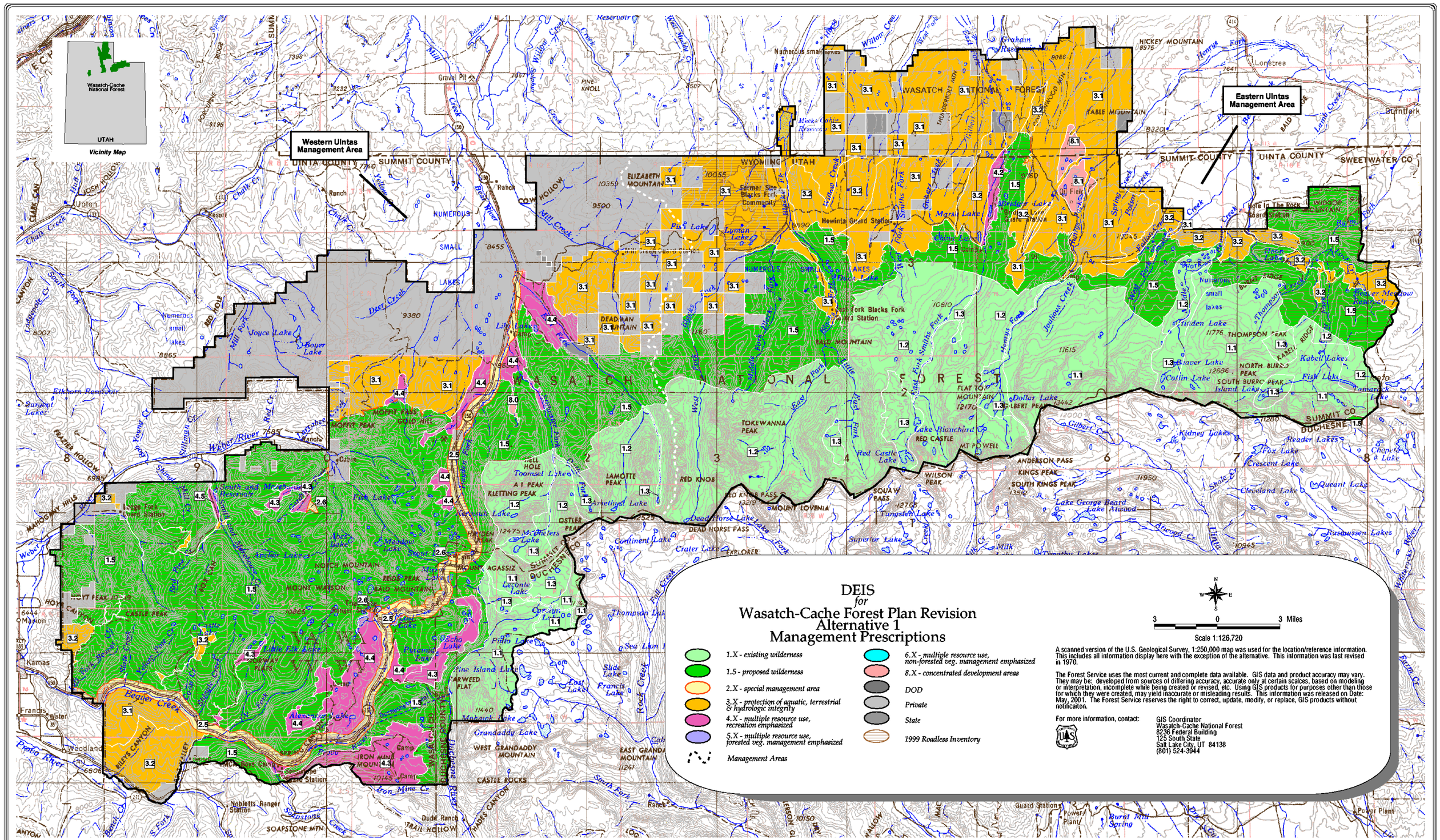
Bear Management Area

North Wasatch - Ogden Valley Management Area

Stansbury Mountains not in correct geographic location



Vicinity Map


Wasatch-Cache National Forest
UTAH
Vicinity Map
Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SWEETWATER CO
DUCHESNE
SUMMIT CO
DEADMAN MOUNTAIN
ELIZABETH MOUNTAIN
TABLE MOUNTAIN
HICKEY MOUNTAIN
BALD MOUNTAIN
TOKEWANNA PEAK
LAMOTTE PEAK
RED KNOB
KLETTING PEAK
A 1 PEAK
HAYDEN PEAK
MOUNT AGASSIZ
MOUNT WILSON
CASTLE PEAK
MOFFIT PEAK
GOLD HILL
CASTLE ROCKS
WEST GRANDADDY MOUNTAIN
EAST GRANDADDY MOUNTAIN
MT POWELL
RED CASTLE
FLAT TOP MOUNTAIN
GILBERT PEAK
THOMPSON PEAK
NORTH BURRO PEAK
SOUTH BURRO PEAK
ANDERSON PASS
KINGS PEAK
SOUTH KINGS PEAK
WILSON PEAK
SQUAW PASS
MOUNT LOVENIA
DEAD HORSE PASS
EXPLORER
Hewinta Guard Station
Upton
Kamas
Francis
Woodland
Marion
Lonetree
Burntfork
Numerous small lakes
Joyce Lake
Boyer Lake
Elkhorn Reservoir
Surgeon Lakes
Weber River
Provo River
Beaver Creek
Deer Creek
Chalk Creek
Mill Creek
Beaver Lake
Coffin Lake
Island Lake
Kabell Lakes
Fish Lake
Kidney Lakes
Reader Lakes
Fox Lake
Crescent Lake
Cleveland Lake
Queant Lake
Lake George Beard
Lake Atwood
Rasmussen Lakes
Tungsten Lake
Superior Lake
Continent Lake
Crater Lake
Red Castle Lake
Lake Blanchard
Dead Horse Lake
Amethyst Lake
Toomsel Lakes
Mohawk Lake
Grandaddy Lake
Thompson Lake
Sea Lion Lake
Slide Lake
Francis Lake
Lost Lake
Rock Creek
Iron Mine Mountain
Iron Mine Cr
Soapstone Mtn
Nobletts Ranger Station
Dudd Ranch
Guard Station
Power Plant
Burnt Mill Spring
Duchesne River
Weber River
Provo River
Scale 1:126,720
3 0 3 Miles
DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 1
Management Prescriptions
1.X - existing wilderness
1.5 - proposed wilderness
2.X - special management area
3.X - protection of aquatic, terrestrial & hydrologic integrity
4.X - multiple resource use, recreation emphasized
5.X - multiple resource use, forested veg. management emphasized
Management Areas
6.X - multiple resource use, non-forested veg. management emphasized
8.X - concentrated development areas
DOD
Private
State
1999 Roadless Inventory
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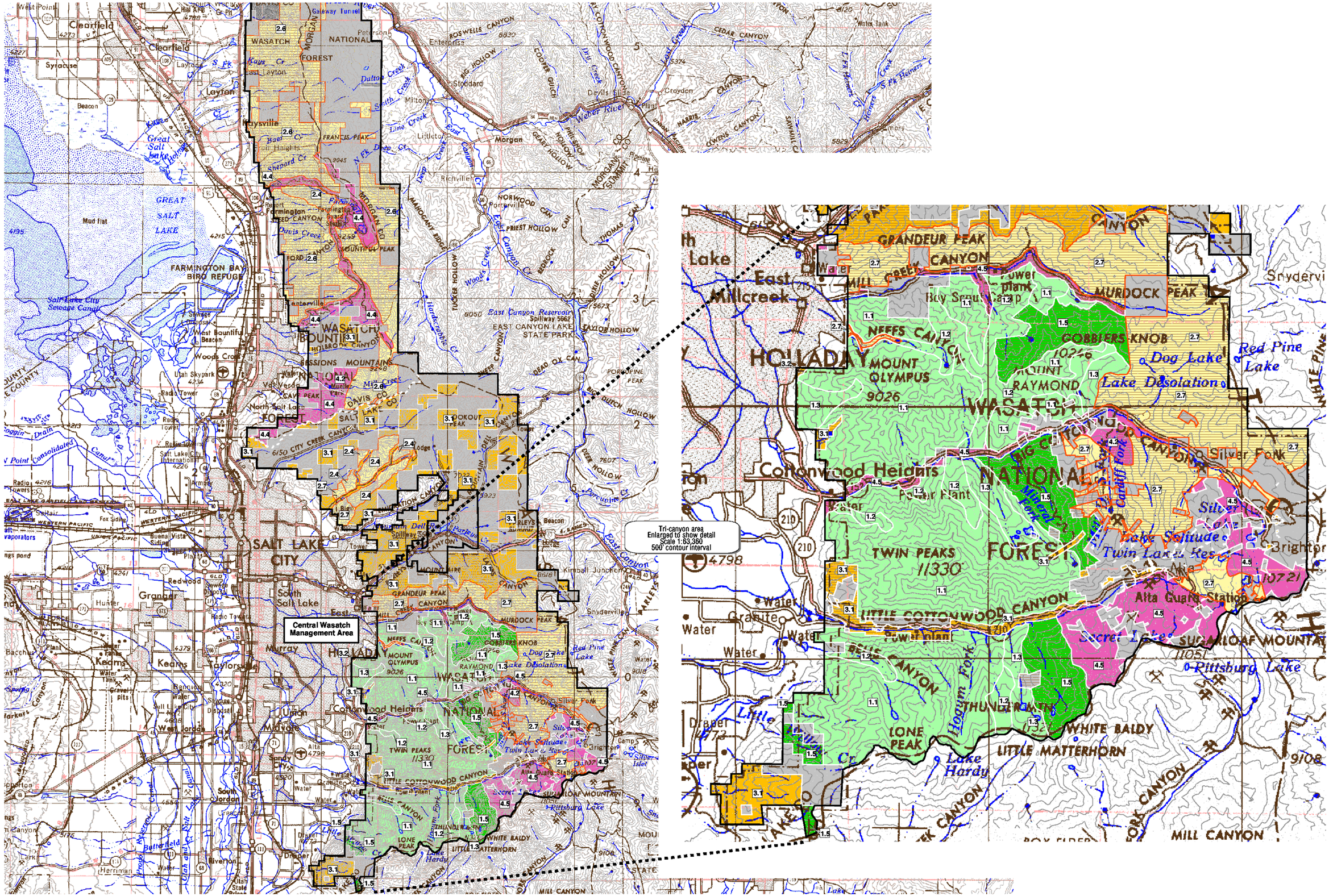
May, 2001



Central Wasatch Management Area

Tri-canyon area
Enlarged to show detail
Scale 1:63,360
500' contour interval

May 2001

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 2
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
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- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*
- *Management Areas*

N W E S

3 0 3 Miles

Scale 1:126,720

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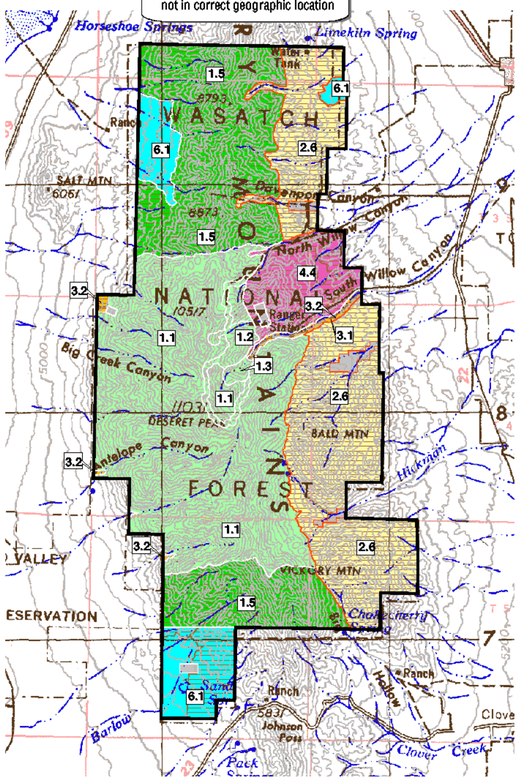
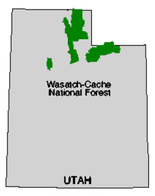
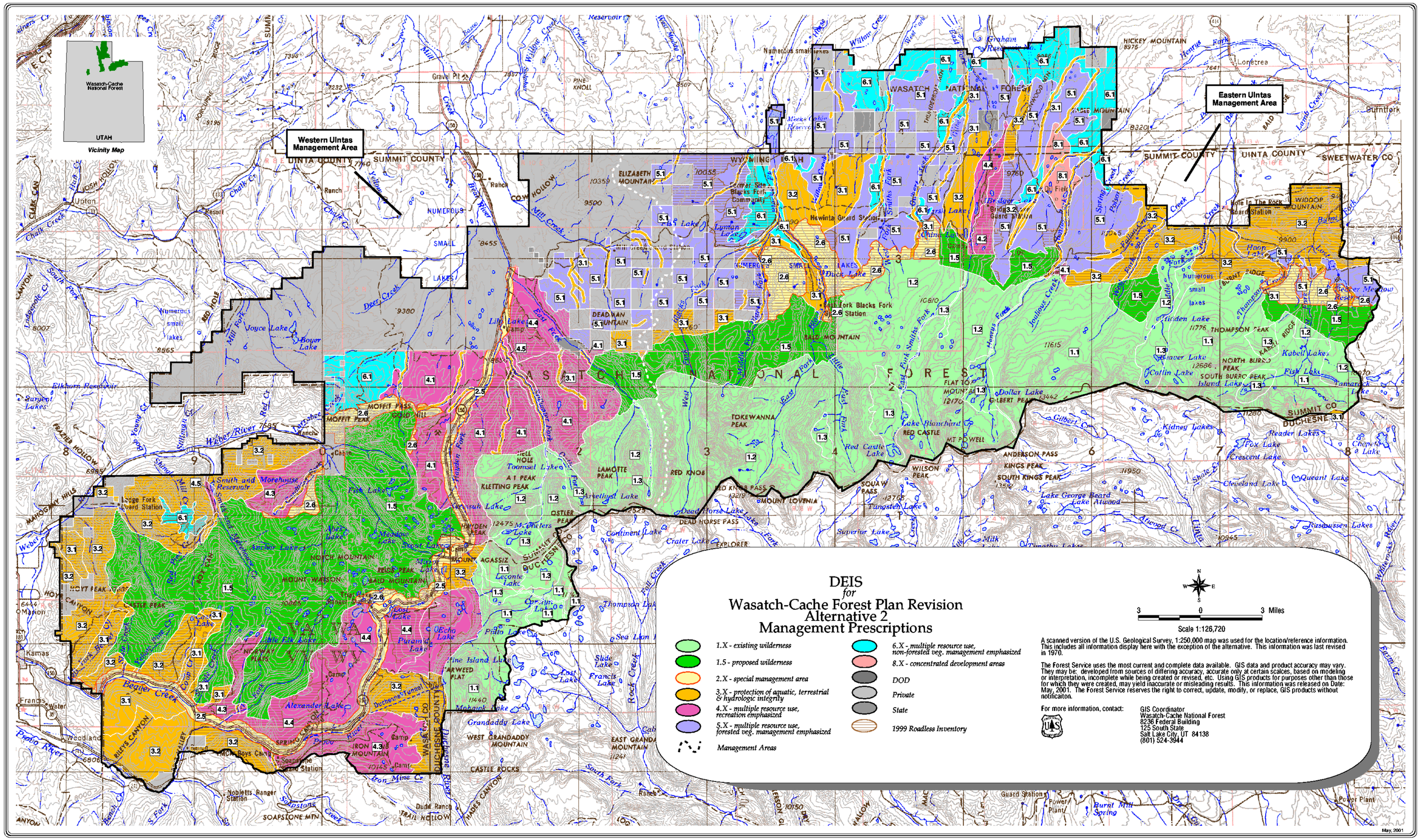
Stansbury Mountains not in correct geographic location





Vicinity Map



DEIS
for
Wasatch-Cache Forest Plan Revision
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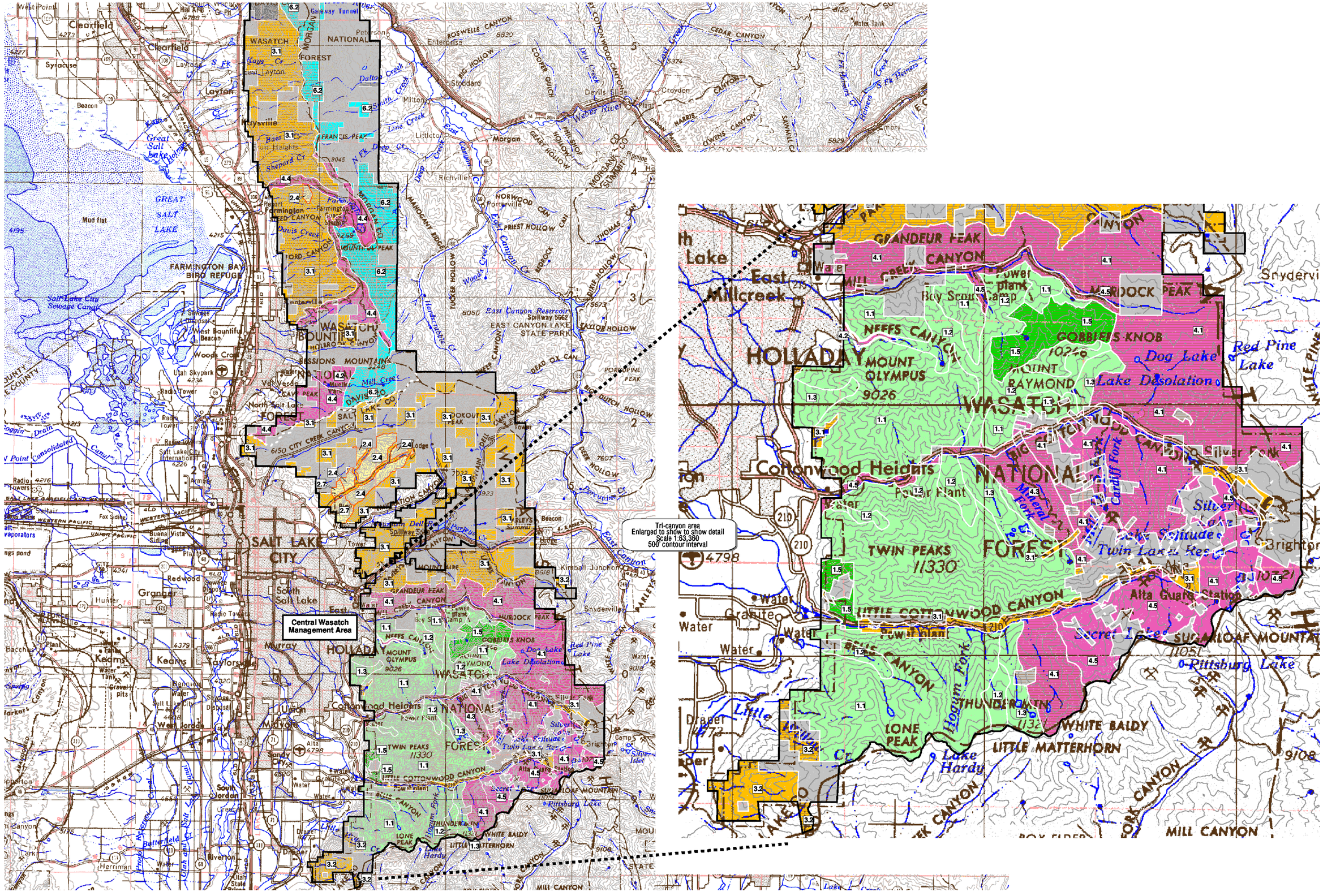
Central Wasatch Management Area
Tri-canyon area
Enlarged to show to show detail
Scale 1:63,360
500' contour interval
WASATCH NATIONAL FOREST
SALT LAKE CITY
HOLLADAY
Cottonwood Heights
GRANDEUR PEAK
MURDOCK PEAK
COBBLES KNOB
MOUNT OLYMPUS
9026
MOUNT RAYMOND
TWIN PEAKS
11330
LITTLE COTTONWOOD CANYON
SUGARLOAF MOUNTAIN
THUNDERBOLT
WHITE BALDY
LITTLE MATTERHORN
LONE PEAK
MILL CANYON
Lake Desolation
Dog Lake
Red Pine Lake
Pittsburg Lake
Lake Hardy
Twin Lakes Res
Secret Lake
Alta Guard Station
Silver Lake
Brighton
Snyderville
Kearns
Taylorsville
Murray
Bacchus
Herriman
Riverton
Draper
Granite
Sandy City
South Jordan
West Jordan
Mayor
Union
Alta
Hunter
Redwood
Grantsville
Farmington
Farmington Bay Bird Refuge
Great Salt Lake
Mud Flat
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Morgan
Morgan Summit
Richville
Porterville
Mountain Dell Reservoir
Spillway 5662
East Canyon Reservoir
Spillway 5662
East Canyon Lake State Park
Salt Lake City Sewage Canal
Salt Lake City International
Radio Tower
Utah Skypark
Beacon
Fox Siding
Buena Vista Siding
Kimball Junction
Snyderville
Brighton
Silver Lake
Silver Islet
Alta Guard Station
Water Tank
Gravel pits
Sewage Disposal
Water
Tower
Camp
Power plant
Boy Scout Camp
Cottonwood Heights
Power Plant
Water
Granite
Draper
Little Willow Cr
Hogum Fork
Cardiff Fork
Silver Fork
Mineral Fork
Little Cottonwood Canyon
Big Cottonwood Canyon
Neffs Canyon
Mill Canyon
Ford Canyon
Bell Canyon
Dry Creek
Mahogany Ridge
Tucker Hollow
Hardscrabble Cr
Woods Creek
East Canyon Cr
Weber River
Great Salt Lake
Salt Lake City Sewage Canal
Jordan River
Mill Creek
Dry Creek
Parleys Canyon
Emigration Canyon
Red Butte Creek
Emigration Creek
Parleys Creek
Kays Cr
Dutton Creek
Shepard Cr
Davis Creek
Line Creek
Deep Creek
Holmes Creek
Weber River
Lake Hardy
Twin Lakes Res
Secret Lake
Pittsburg Lake
Lake Desolation
Dog Lake
Red Pine Lake
Alta Guard Station
Silver Lake
Brighton
Snyderville
Kearns
Taylorsville
Murray
Bacchus
Herriman
Riverton
Draper
Granite
Sandy City
South Jordan
West Jordan
Mayor
Union
Alta
Hunter
Redwood
Grantsville
Farmington
Farmington Bay Bird Refuge
Great Salt Lake
Mud Flat
Clearfield
Syracuse
Layton
Kaysville
Fruit Heights
Morgan
Morgan Summit
Richville
Porterville
Mountain Dell Reservoir
Spillway 5662
East Canyon Reservoir
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East Canyon Lake State Park
Salt Lake City Sewage Canal
Salt Lake City International
Radio Tower
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Beacon
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Silver Lake
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Water Tank
Gravel pits
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Boy Scout Camp
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Power Plant
Water
Granite
Draper
Little Willow Cr
Hogum Fork
Cardiff Fork
Silver Fork
Mineral Fork
Little Cottonwood Canyon
Big Cottonwood Canyon
Neffs Canyon
Mill Canyon
Ford Canyon
Bell Canyon
Dry Creek
Mahogany Ridge
Tucker Hollow
Hardscrabble Cr
Woods Creek
East Canyon Cr
Weber River
Great Salt Lake
Salt Lake City Sewage Canal
Jordan River
Mill Creek
Dry Creek
Parleys Canyon
Emigration Canyon
Red Butte Creek
Emigration Creek
Parleys Creek
Kays Cr
Dutton Creek
Shepard Cr
Davis Creek
Line Creek
Deep Creek
Holmes Creek
Weber River

May 2001

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 3
Management Prescriptions

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- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*
- *Management Areas*

N W E S

3 0 3 Miles

Scale 1:126,720

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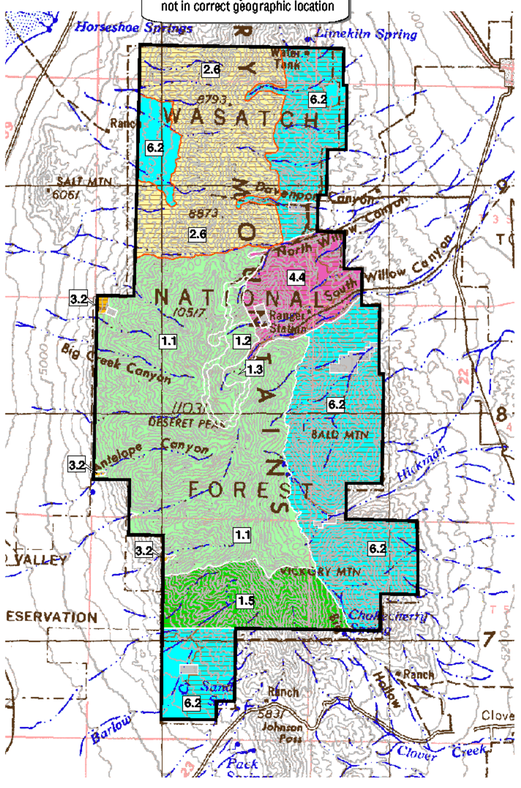
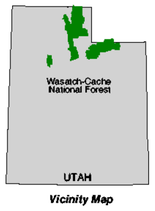
Bear Management Area

Cache - Box Elder Management Area

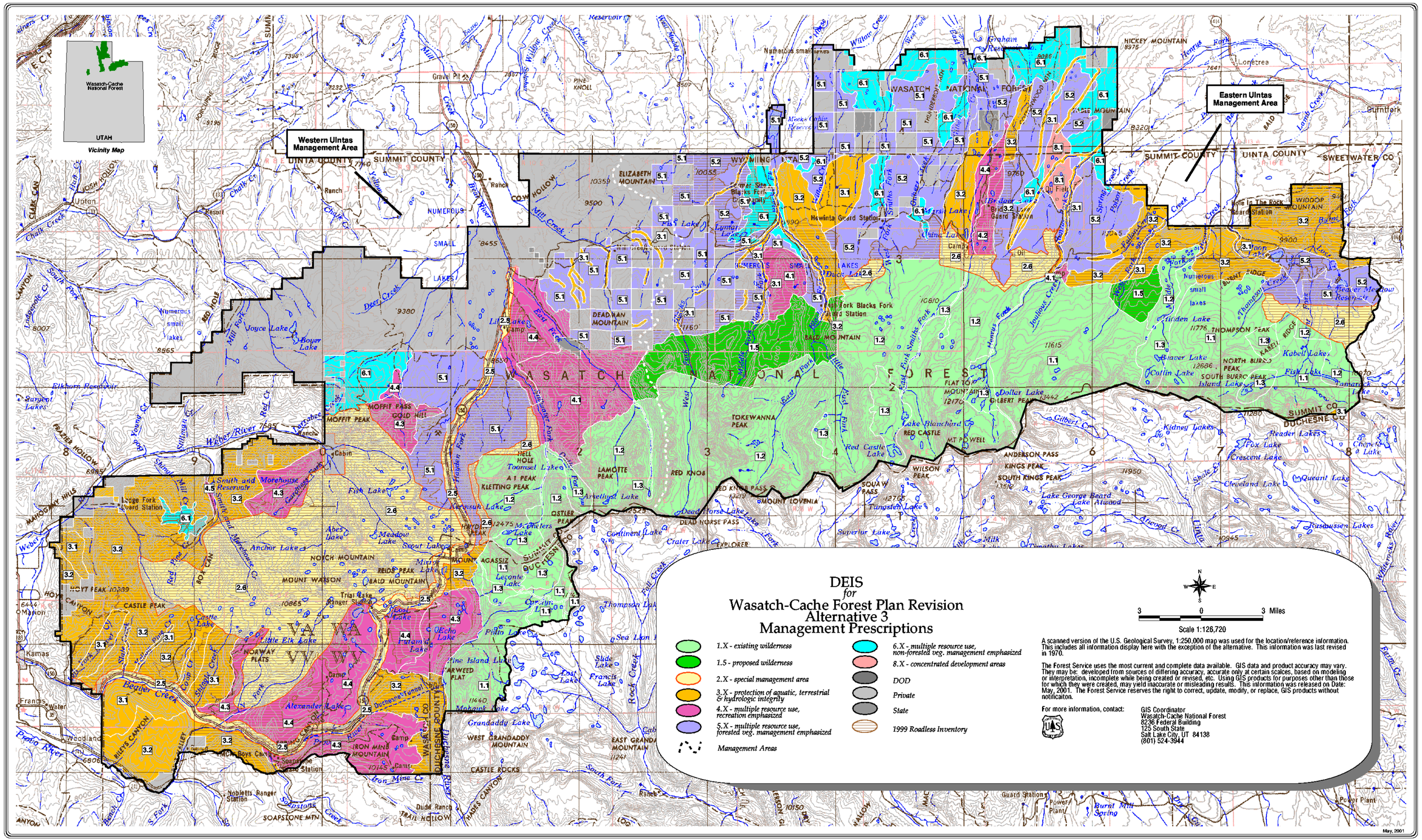
North Wasatch - Ogden Valley Management Area

Stansbury Mountains not in correct geographic location





Vicinity Map



DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 3
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *Management Areas*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*

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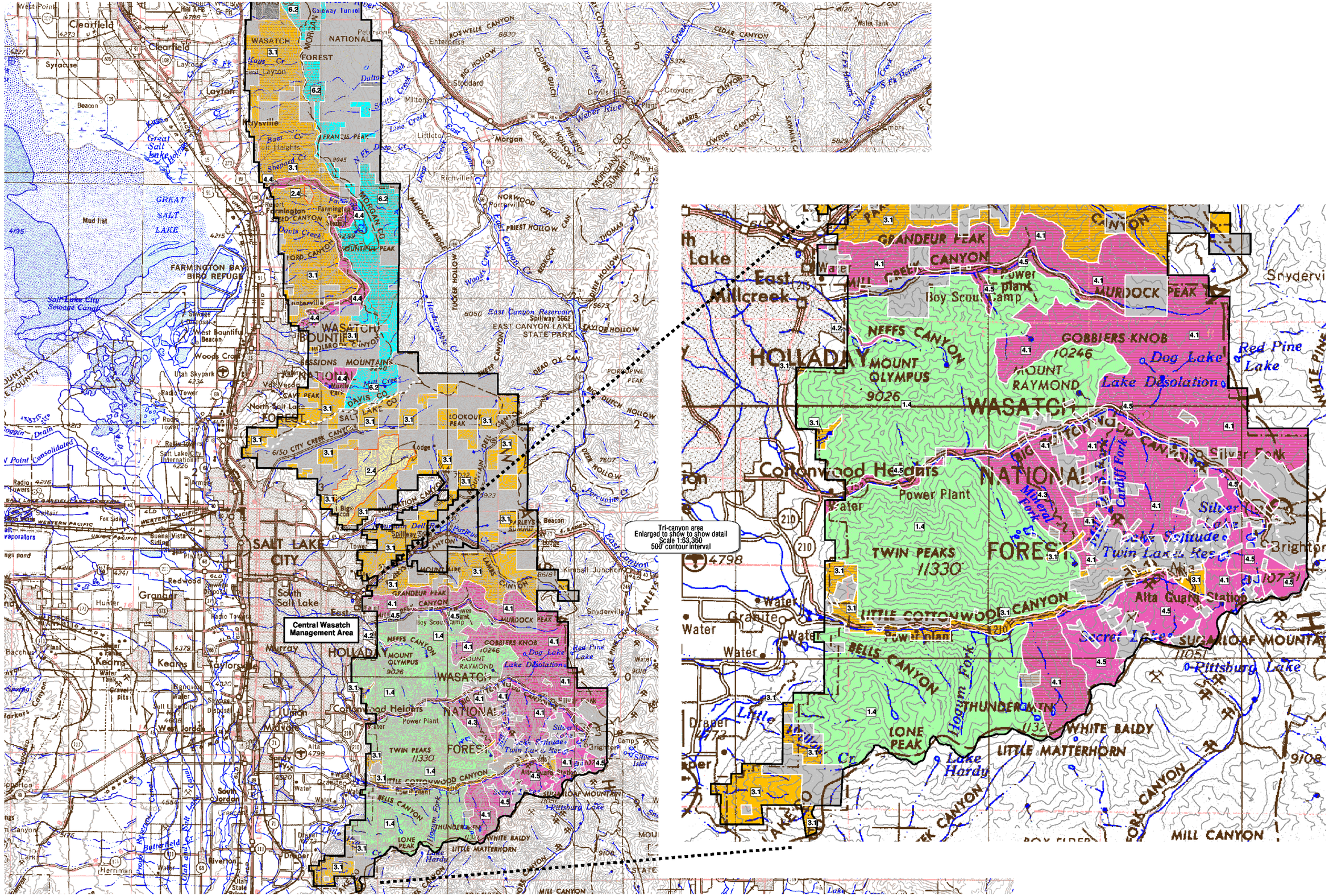
For more information, contact:

GIS Coordinator
Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3944

May, 2001



Central Wasatch Management Area

Tri-canyon area
Enlarged to show to show detail
Scale 1:63,360
500' contour interval

May 2001

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 4
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*
- *Management Areas*

N W E S

3 0 3 Miles

Scale 1:126,720

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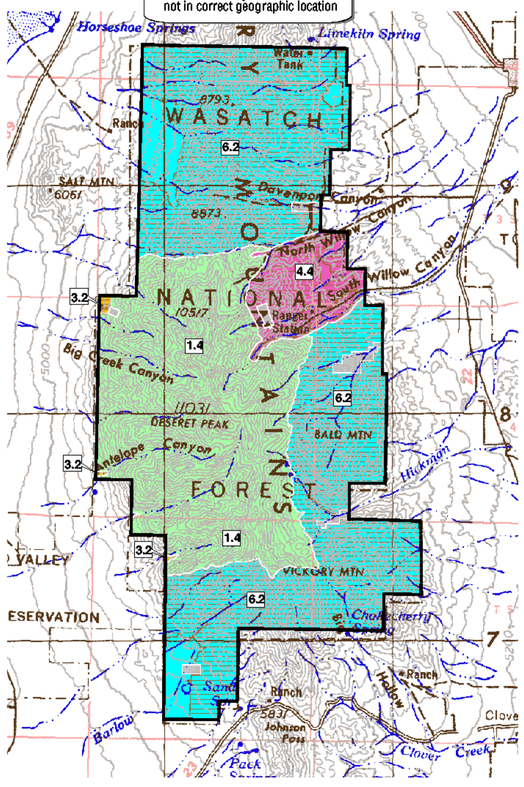
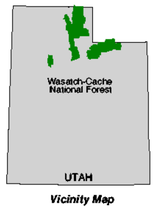
Cache - Box Elder Management Area

Bear Management Area

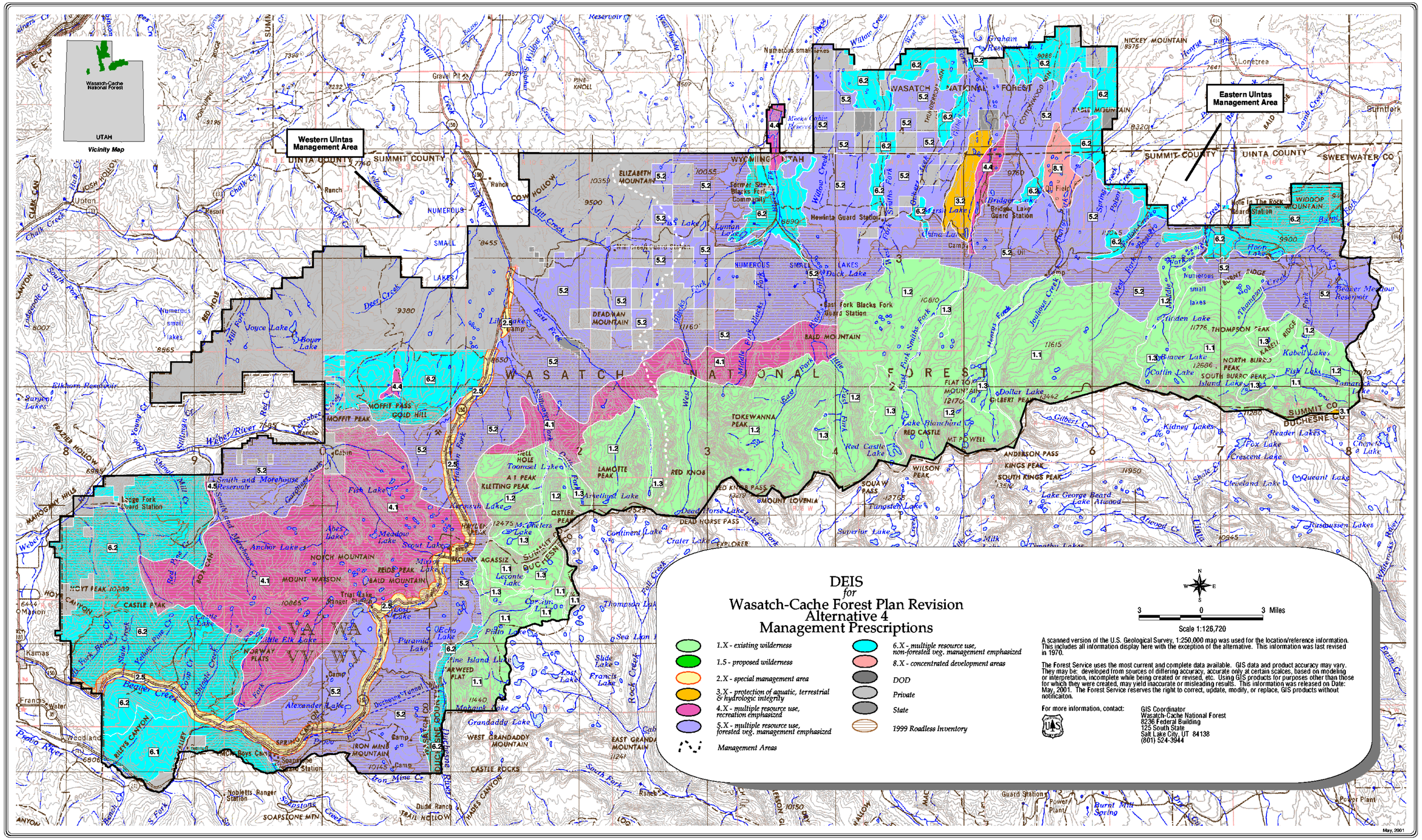
North Wasatch - Ogden Valley Management Area

Stansbury Mountains not in correct geographic location





Vicinity Map



DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 4
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *Management Areas*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*

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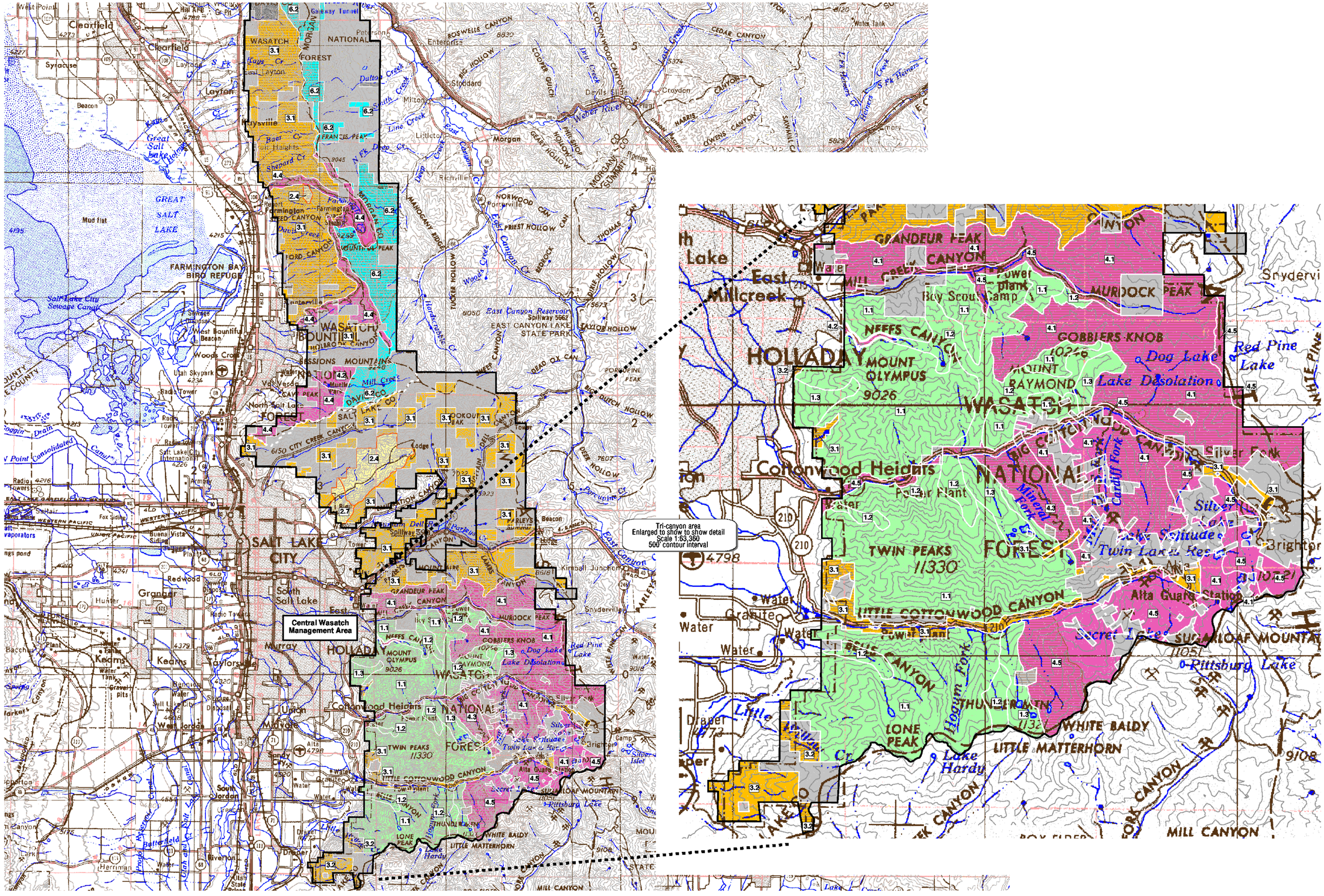
Central Wasatch Management Area
Tri-canyon area
Enlarged to show to show detail
Scale 1:63,360
500' contour interval
SALT LAKE CITY
WASATCH NATIONAL FOREST
HOLLADAY
Cottonwood Heights
TWIN PEAKS 11330
LITTLE COTTONWOOD CANYON
BIG COTTONWOOD CANYON
GRANDEUR PEAK
MURDOCK PEAK
GOBBLERS KNOB
MOUNT OLYMPUS 9026
MOUNT RAYMOND
Lake Desolation
Dog Lake
Red Pine Lake
Alta Guard Station
Silver Lake
Twin Lakes Res
Brighton
Snyderville
Kearns
Murray
Millcreek
East Millcreek
Granite
Draper
Sandy
South Jordan
Bluffdale
Herriman
Farmington
Bountiful
Clearfield
Layton
Syracuse
Morgan
Mountain Dell Reservoir
East Canyon Reservoir
EAST CANYON LAKE STATE PARK
FARMINGTON BAY BIRD REFUGE
GREAT SALT LAKE
Salt Lake City Sewage Canal
Lake Hardy
Pittsburg Lake
WHITE BALDY
LITTLE MATTERHORN
LONE PEAK
THUNDER MTN
MILL CANYON
Silver Fork
Cardiff Fork
Mineral Fork
Hogum Fork
Little Willow Cr
Water
Power plant
Boy Scout Camp
Water Tank
Radio Tower
Sewage Disposal
Gravel pits
Lodge
Beacon
Tower
Spillway 5662
Spillway 5673
Kimball Junction
Parleys Summit
Morgan Summit
Pipeline
Camp
Silver Islet
Snydervi
Brightor

May 2001

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 5
Management Prescriptions

- 1.X - *existing wilderness*
- 1.5 - *proposed wilderness*
- 2.X - *special management area*
- 3.X - *protection of aquatic, terrestrial & hydrologic integrity*
- 4.X - *multiple resource use, recreation emphasized*
- 5.X - *multiple resource use, forested veg. management emphasized*
- *Management Areas*
- 6.X - *multiple resource use, non-forested veg. management emphasized*
- 8.X - *concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*

N W E S

3 0 3 Miles

Scale 1:126,720

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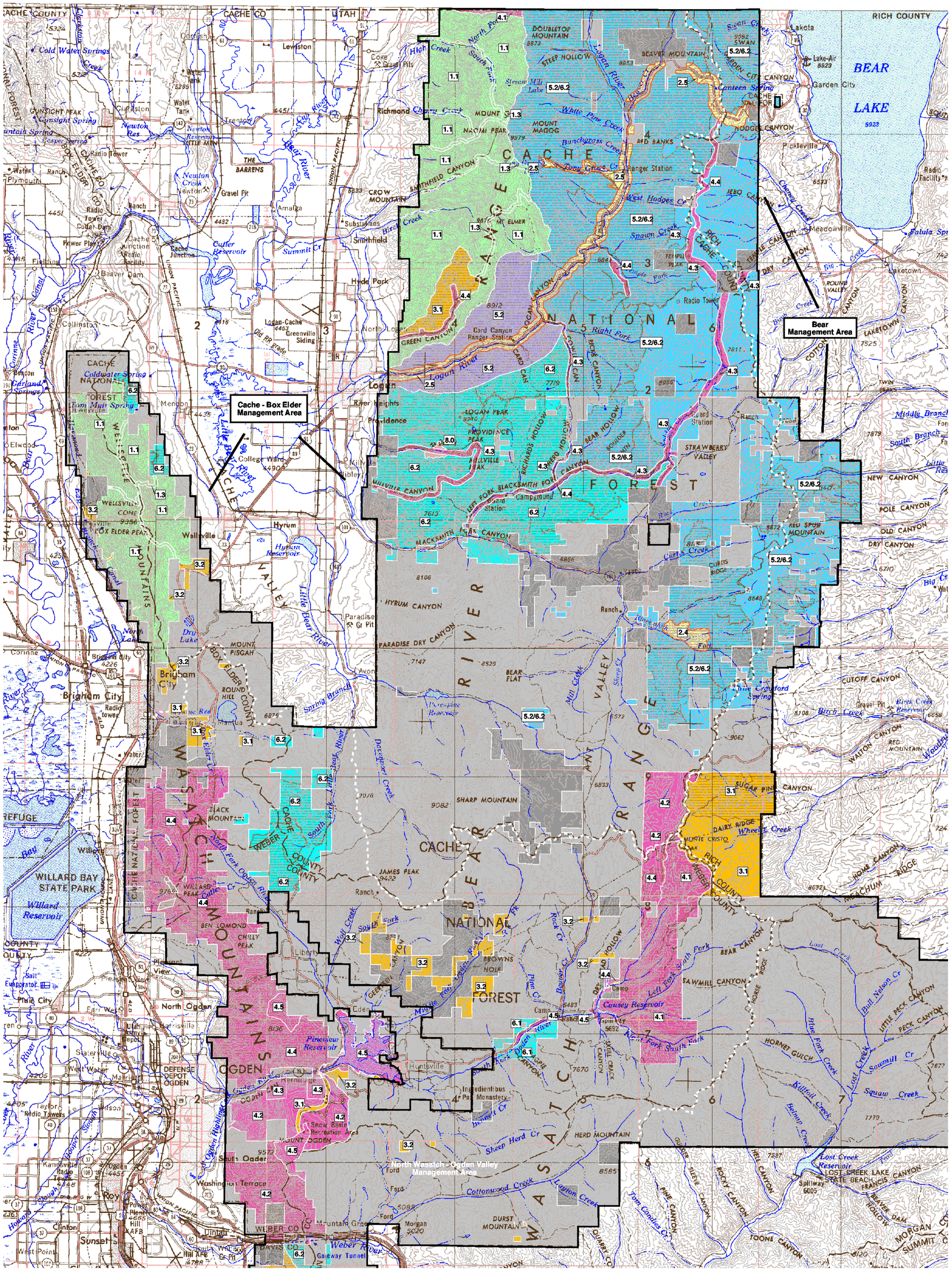
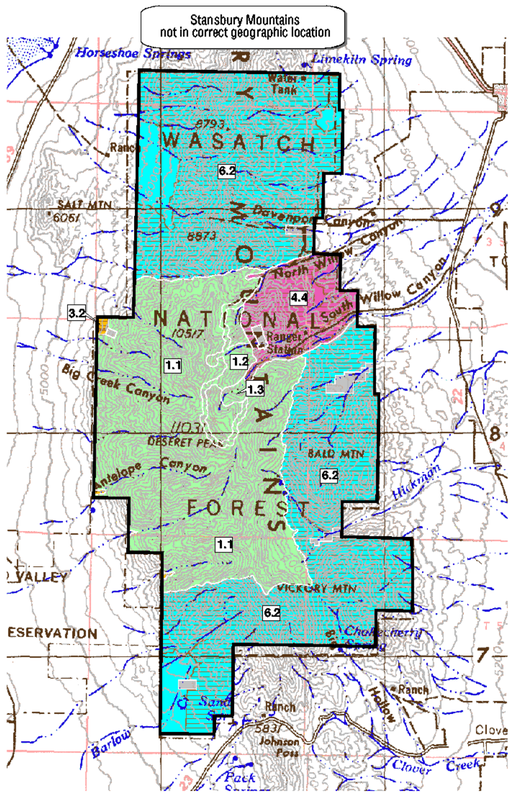
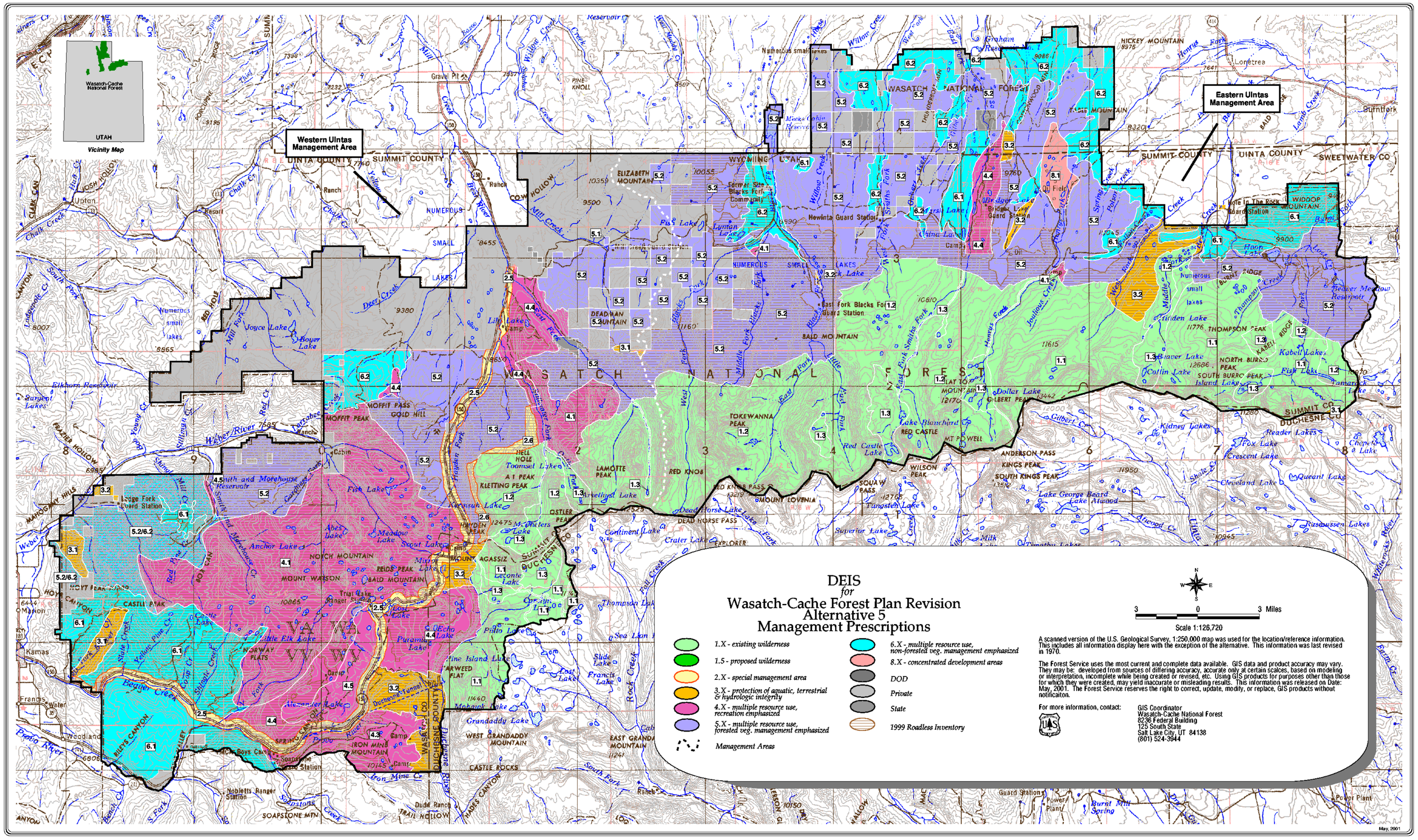




Vicinity Map



DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 5
Management Prescriptions

- 🟩 *1.X - existing wilderness*
- 🟩 *1.5 - proposed wilderness*
- 🟨 *2.X - special management area*
- 🟧 *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- 🟪 *4.X - multiple resource use, recreation emphasized*
- 🟪 *5.X - multiple resource use, forested veg. management emphasized*
- *Management Areas*
- 🟦 *6.X - multiple resource use, non-forested veg. management emphasized*
- 🟥 *8.X - concentrated development areas*
- ⬛ *DOD*
- ⬜ *Private*
- ⬛ *State*
- ▤ *1999 Roadless Inventory*

3 0 3 Miles

Scale 1:126,720

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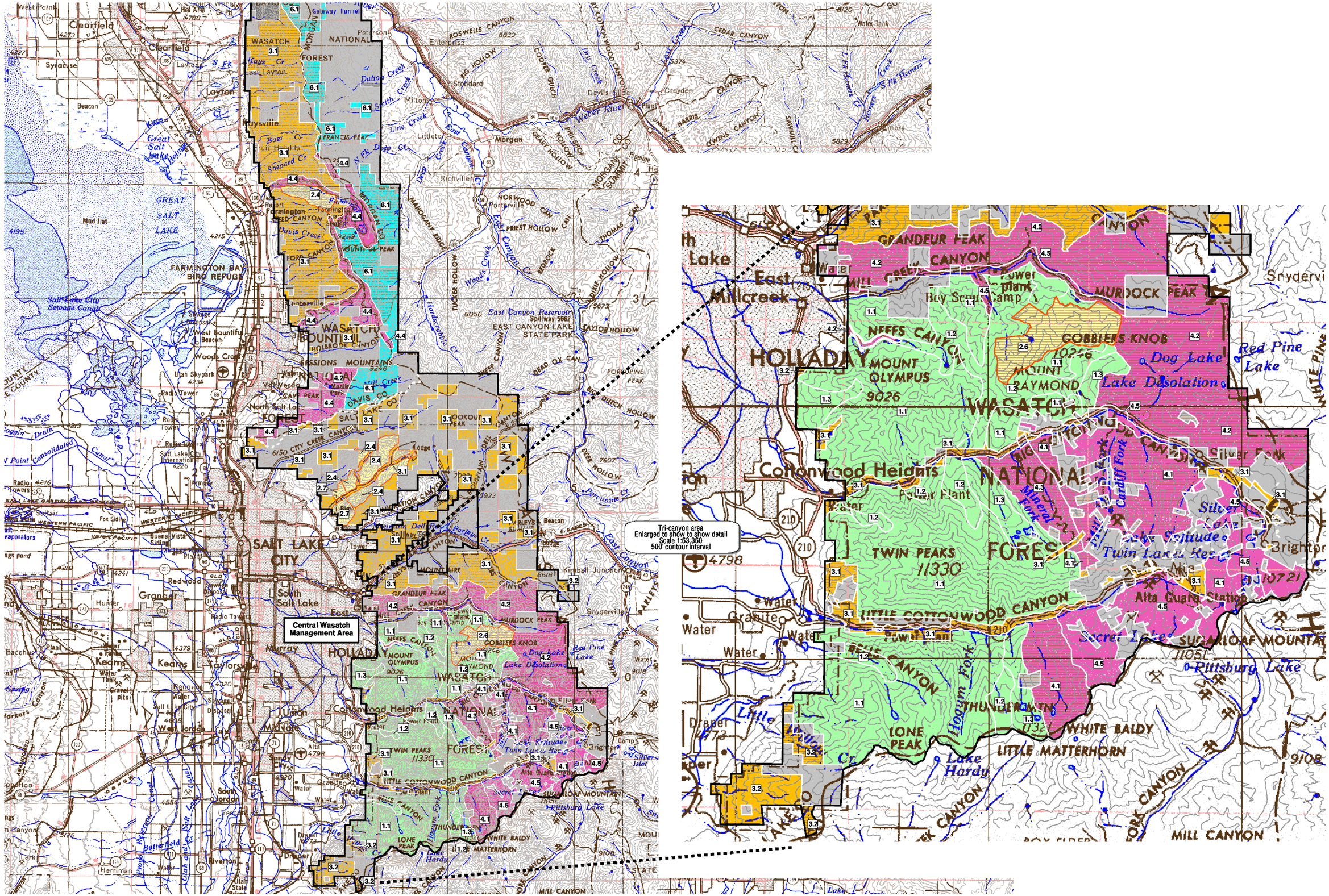
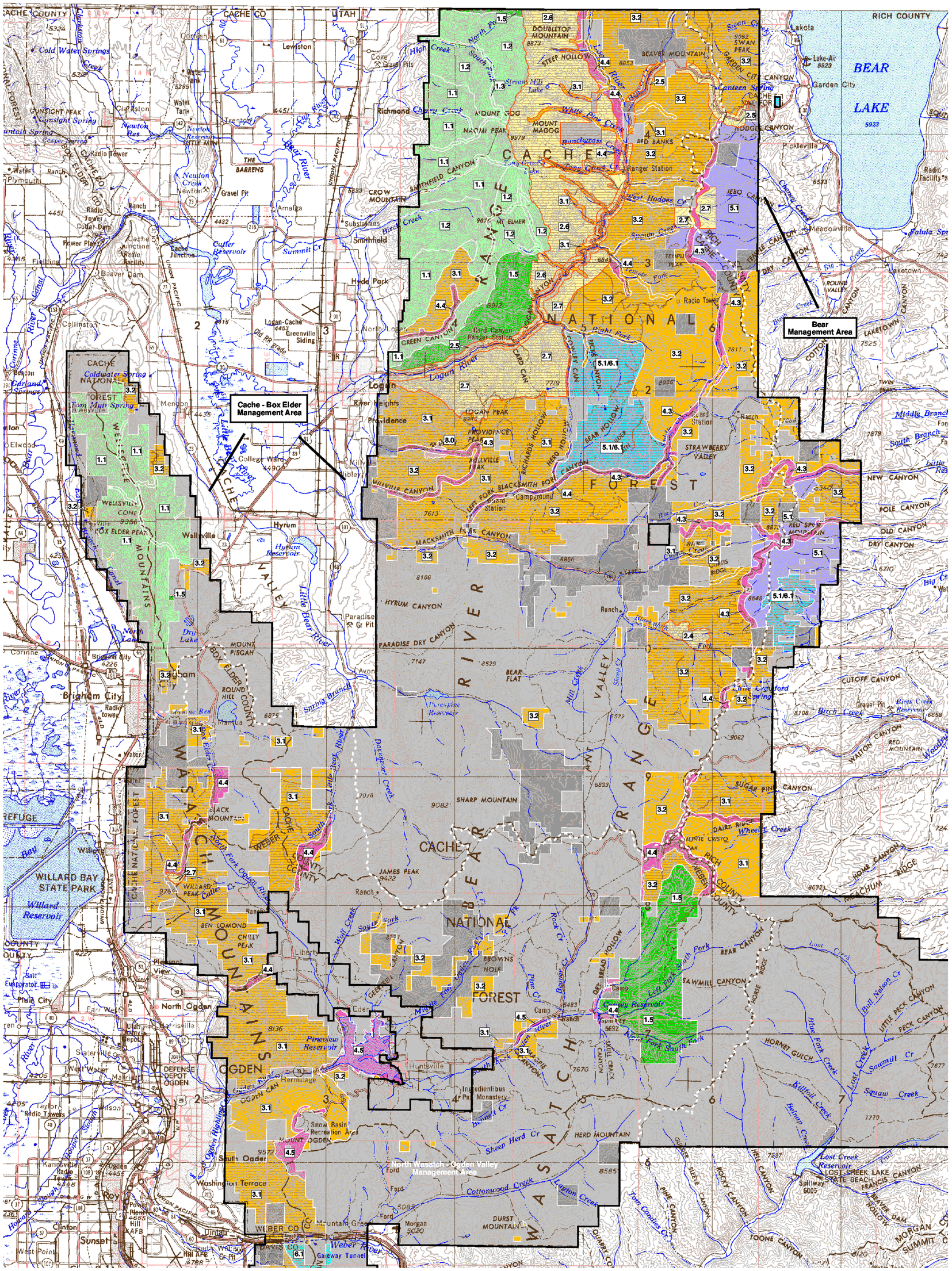


Central Wasatch Management Area

Tri-canyon area
Enlarged to show to show detail
Scale 1:63,360
500' contour interval

May 2001



DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 6 (Preferred)
Management Prescriptions

- 1.X - *existing wilderness*
- 1.5 - *proposed wilderness*
- 2.X - *special management area*
- 3.X - *protection of aquatic, terrestrial & hydrologic integrity*
- 4.X - *multiple resource use, recreation emphasized*
- 5.X - *multiple resource use, forested veg. management emphasized*
- *Management Areas*
- 6.X - *multiple resource use, non-forested veg. management emphasized*
- 8.X - *concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*

N W E S

3 0 3 Miles

Scale 1:126,720

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Salt Lake City, UT 84138
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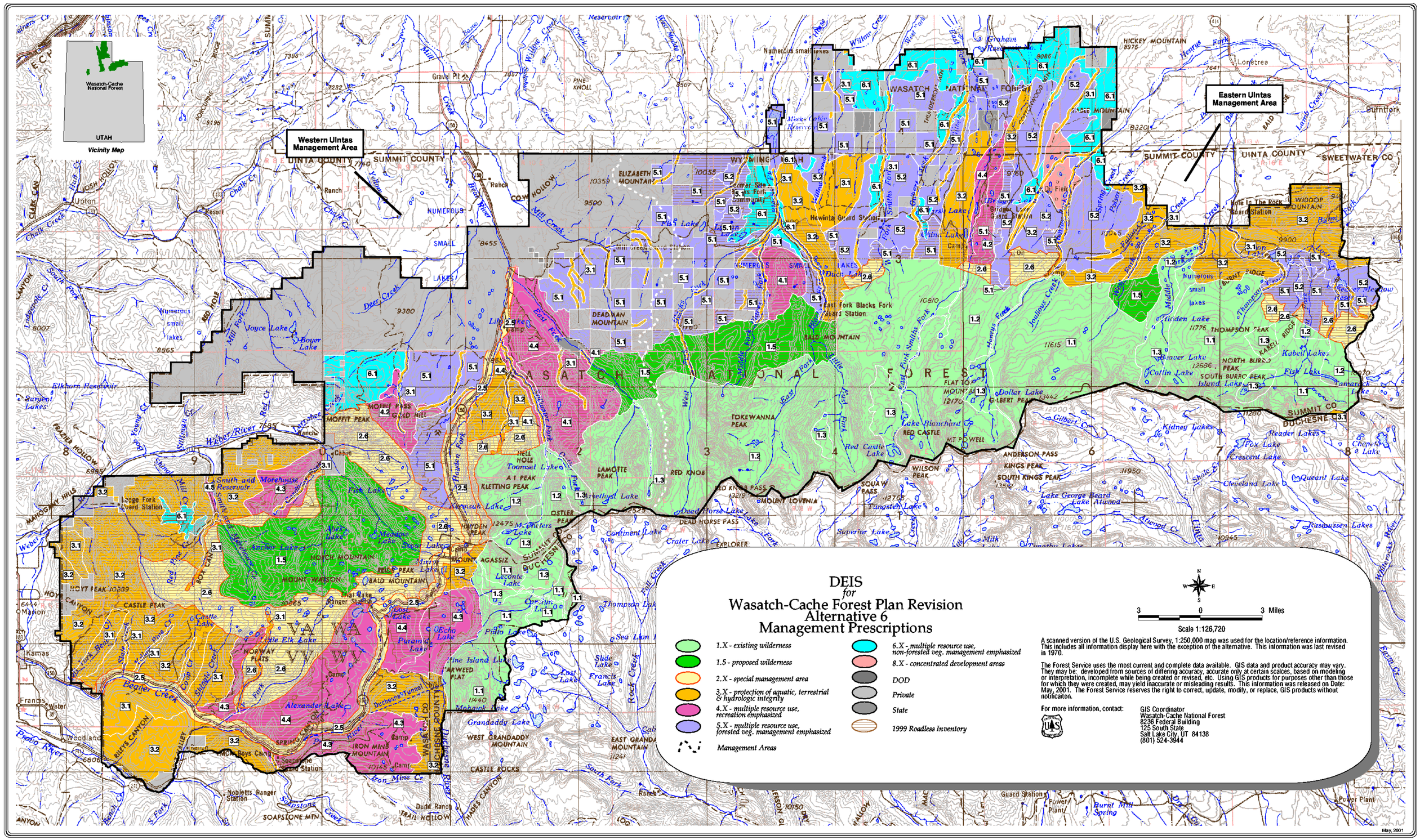

DEIS
for
Wasatch-Cache Forest Plan Revision
Alternative 6
Management Prescriptions

- *1.X - existing wilderness*
- *1.5 - proposed wilderness*
- *2.X - special management area*
- *3.X - protection of aquatic, terrestrial & hydrologic integrity*
- *4.X - multiple resource use, recreation emphasized*
- *5.X - multiple resource use, forested veg. management emphasized*
- *Management Areas*
- *6.X - multiple resource use, non-forested veg. management emphasized*
- *8.X - concentrated development areas*
- *DOD*
- *Private*
- *State*
- *1999 Roadless Inventory*

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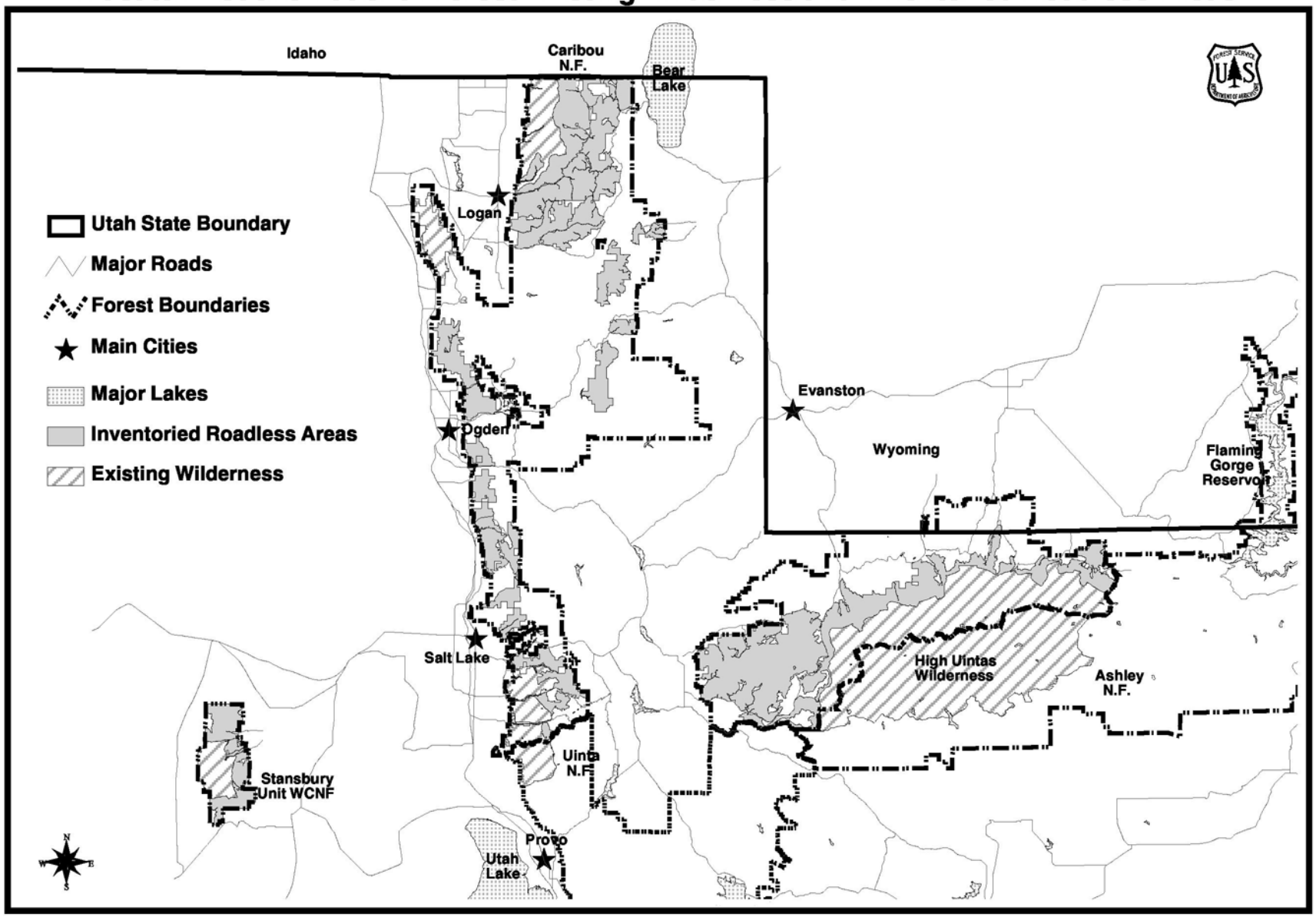
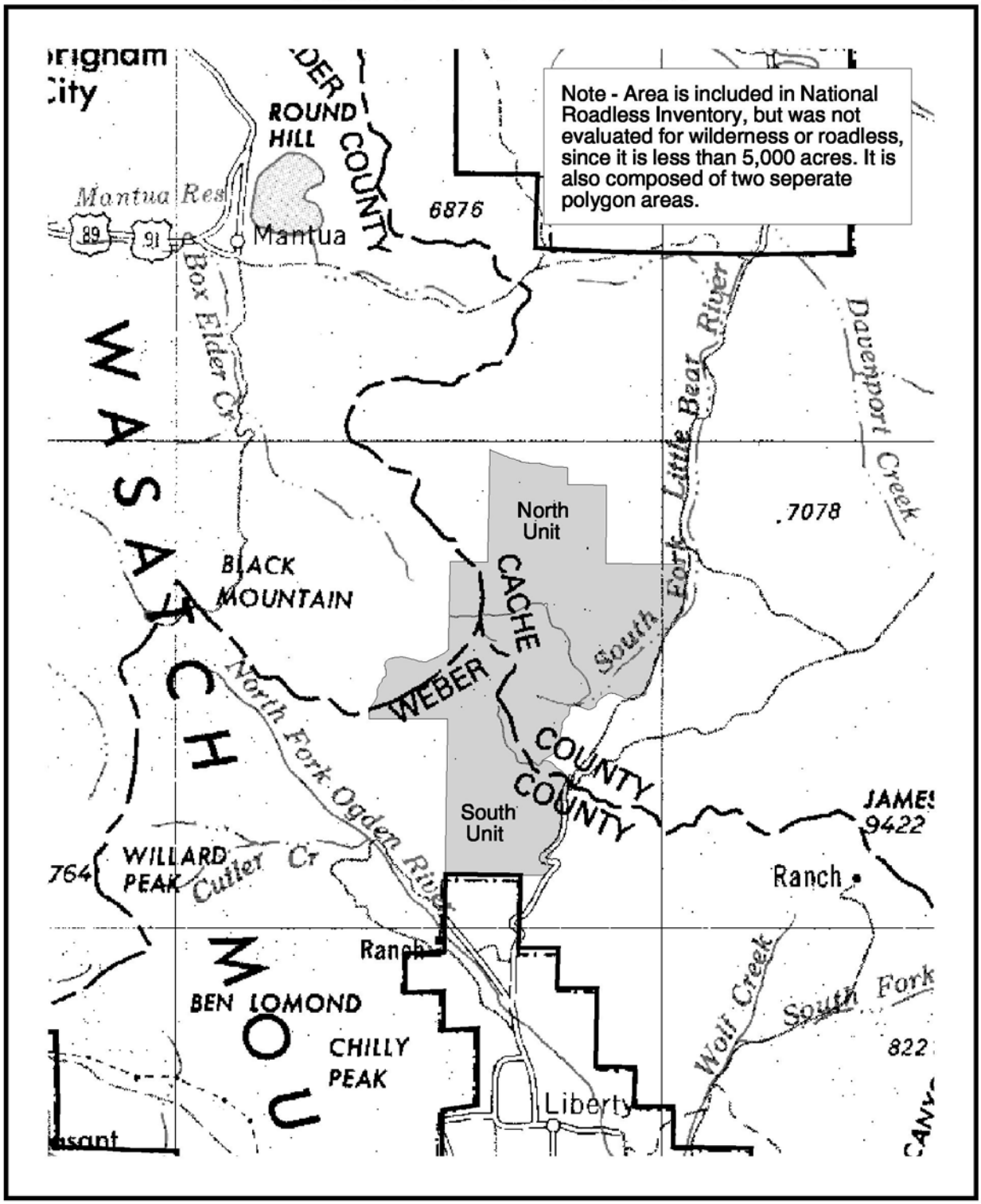
Wasatch - Cache National Forest Existing Wilderness and Inventoried Roadless Areas

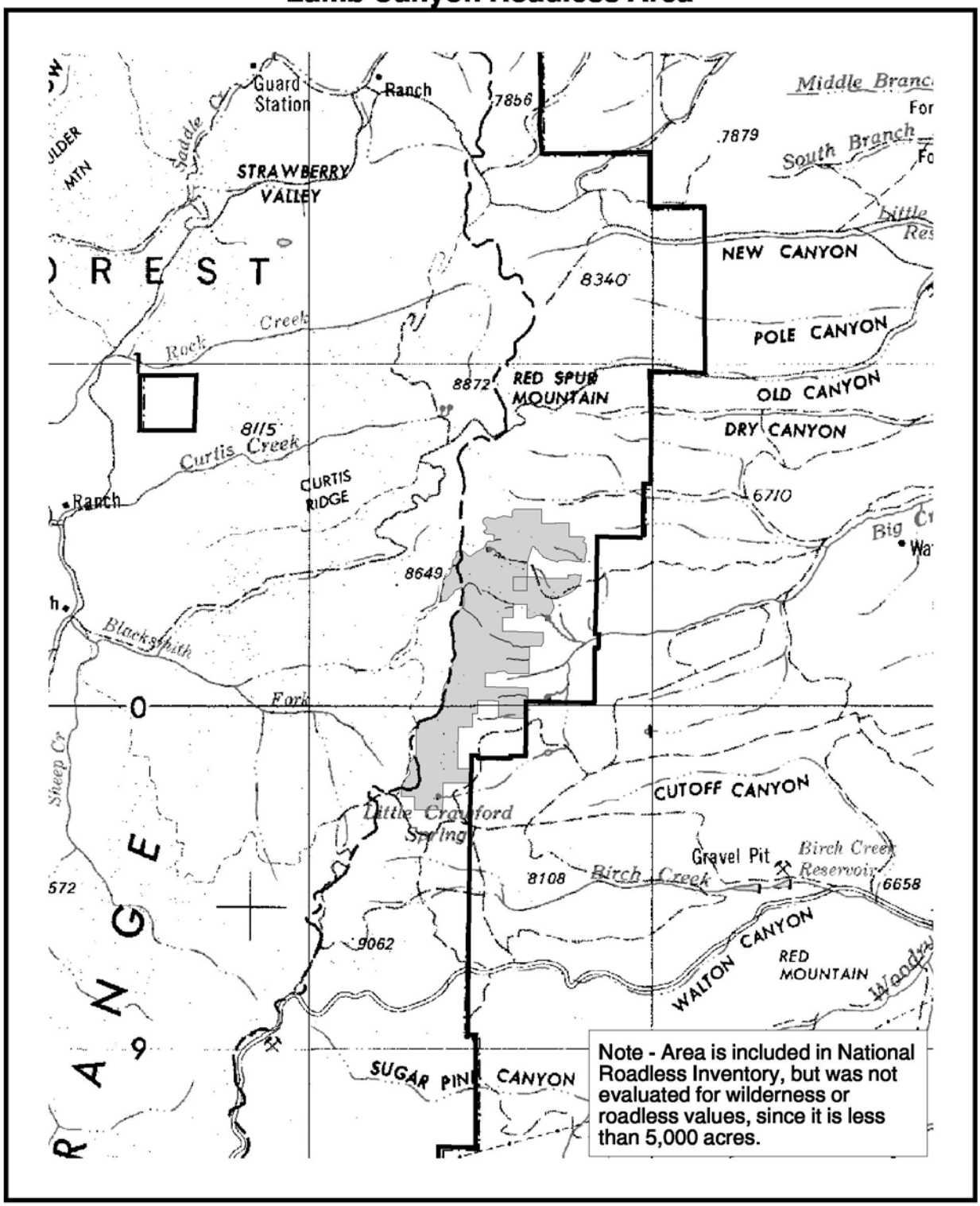


Public Grove Roadless Area



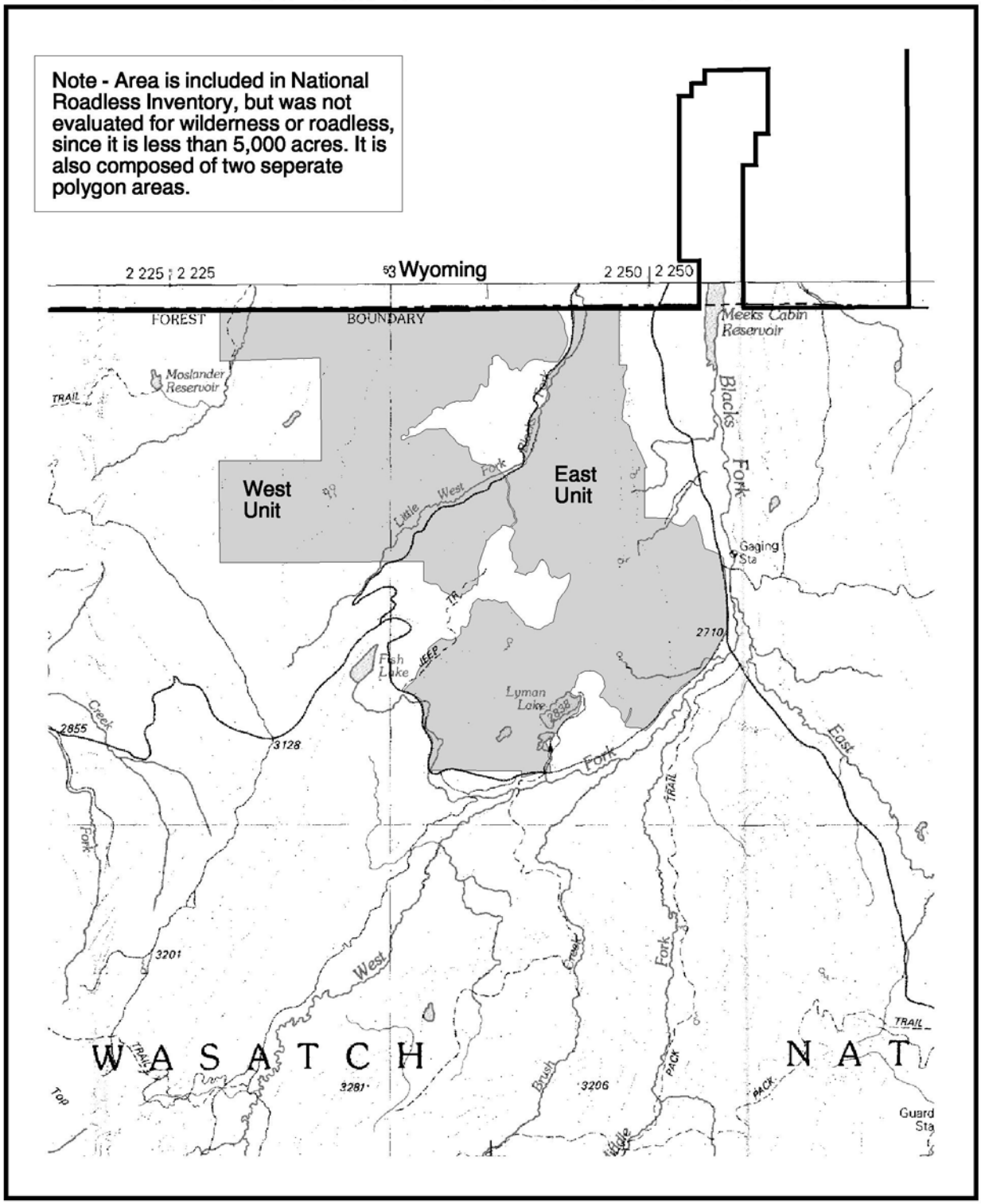
Public Grove Roadless Area
District: Ogden
Management Area: North Wasatch - Ogden Valley
Size: 3620 + 3158 (2 polygons) Acres

Lamb Canyon Roadless Area



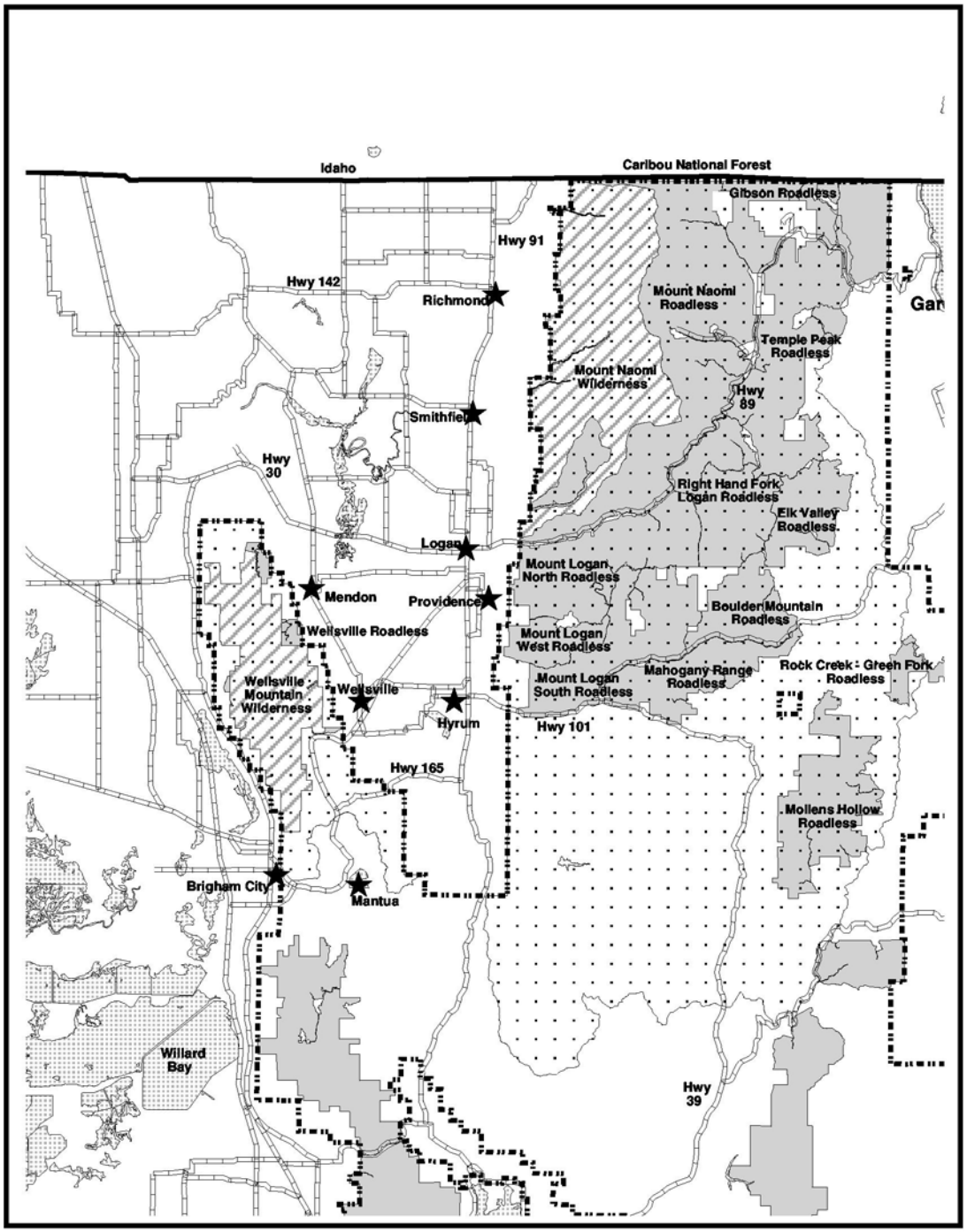
Lamb Canyon Roadless Area
District: Ogden
Management Area: Bear
Size: 4,293 Acres

Little West Fork BlacksRoadless Area



Little West Fork BlacksRoadless Area
District: Evanston/Mountain View
Management Area: Eastern Uintas
Size: 4,634 + 3,845 (2 polygons) Acres

Cache/Box Elder Management Area Roadless Areas

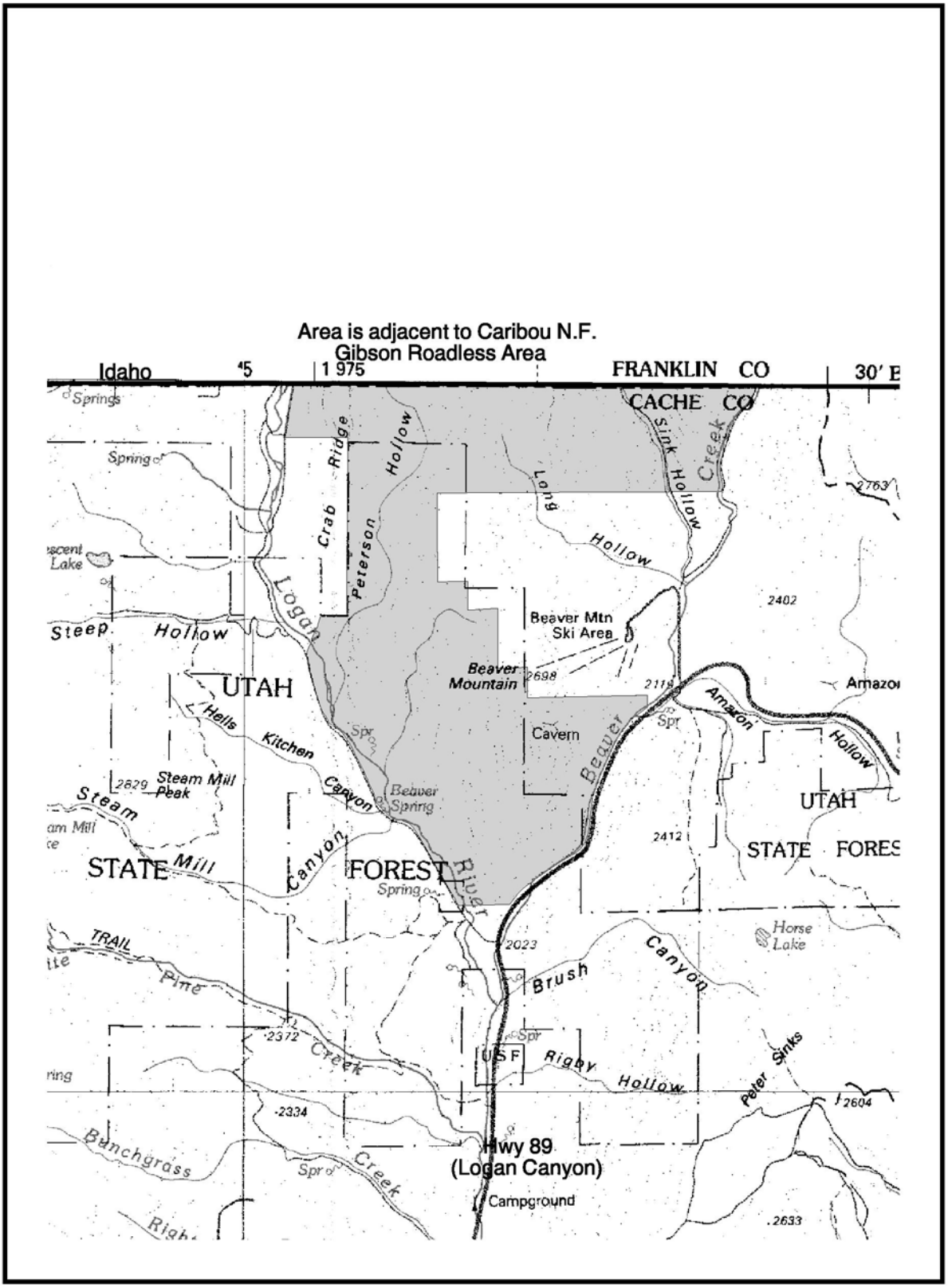


Cache/Box Elder Management Area

Inventoried Roadless Areas

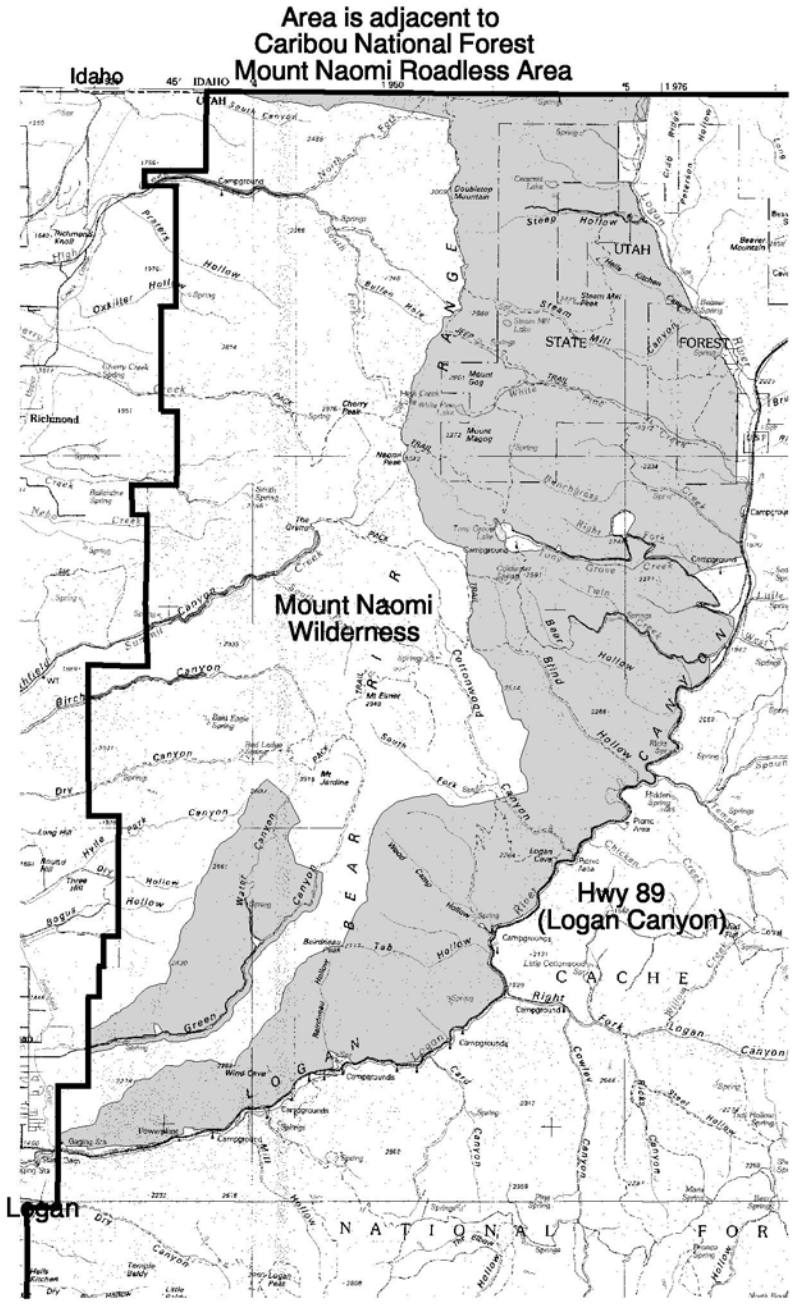
Existing Wilderness

Gibson Roadless Area



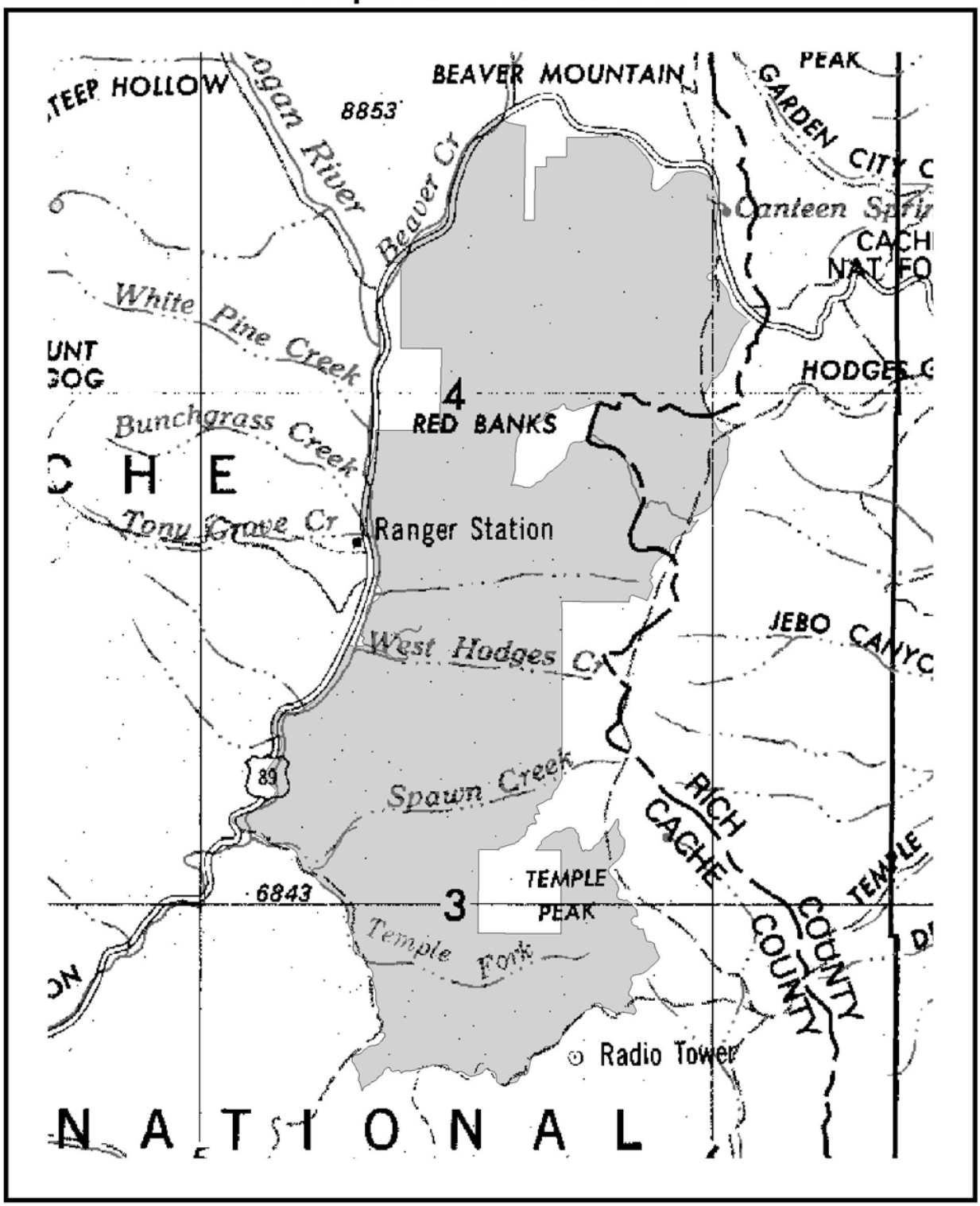
Gibson Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 5,347 Acres

Mount Naomi Roadless Area



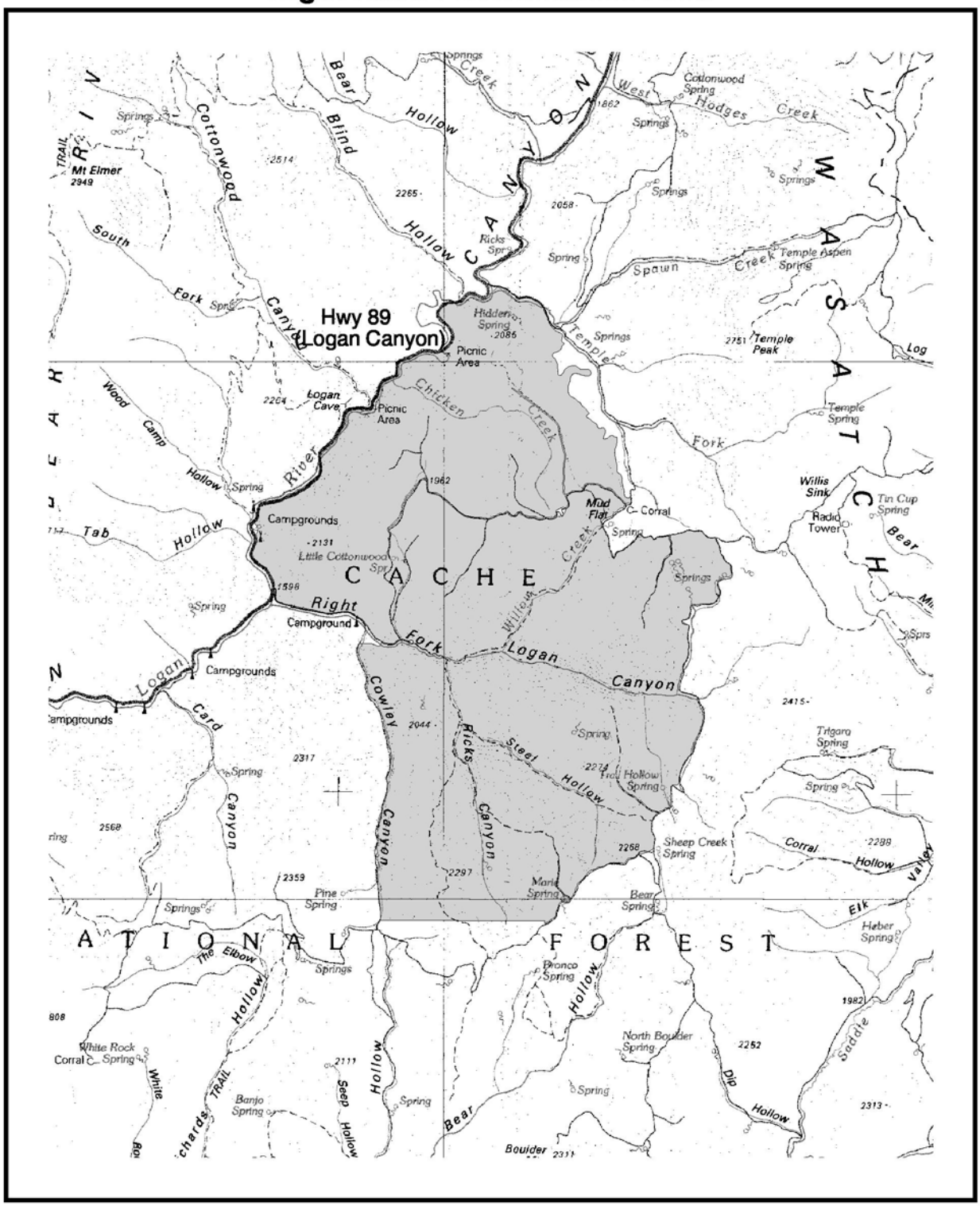
Mount Naomi Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 45,122 Acres

Temple Peak Roadless Area



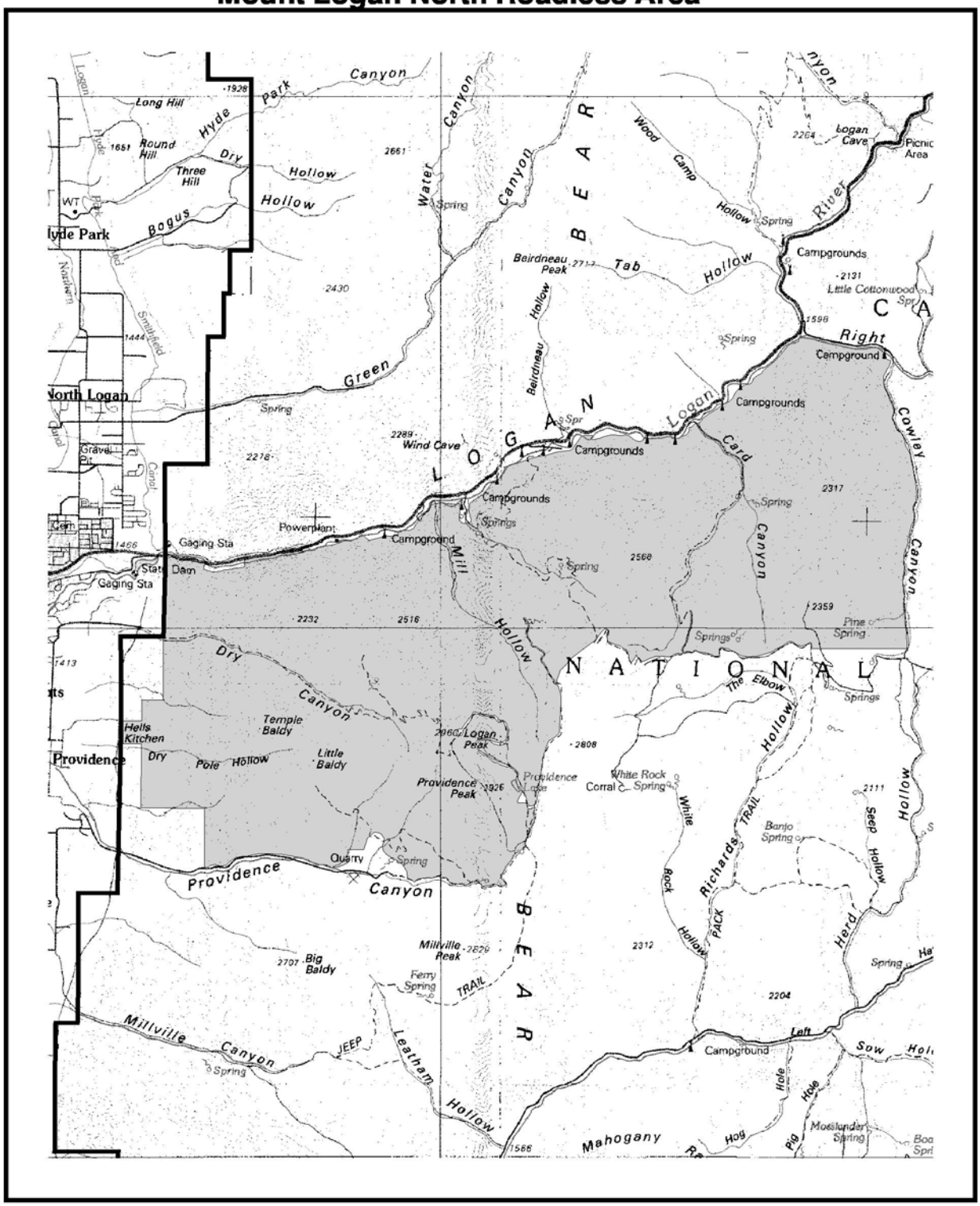
Temple Peak Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 23,724 Acres

Right Hand Fork Roadless Area



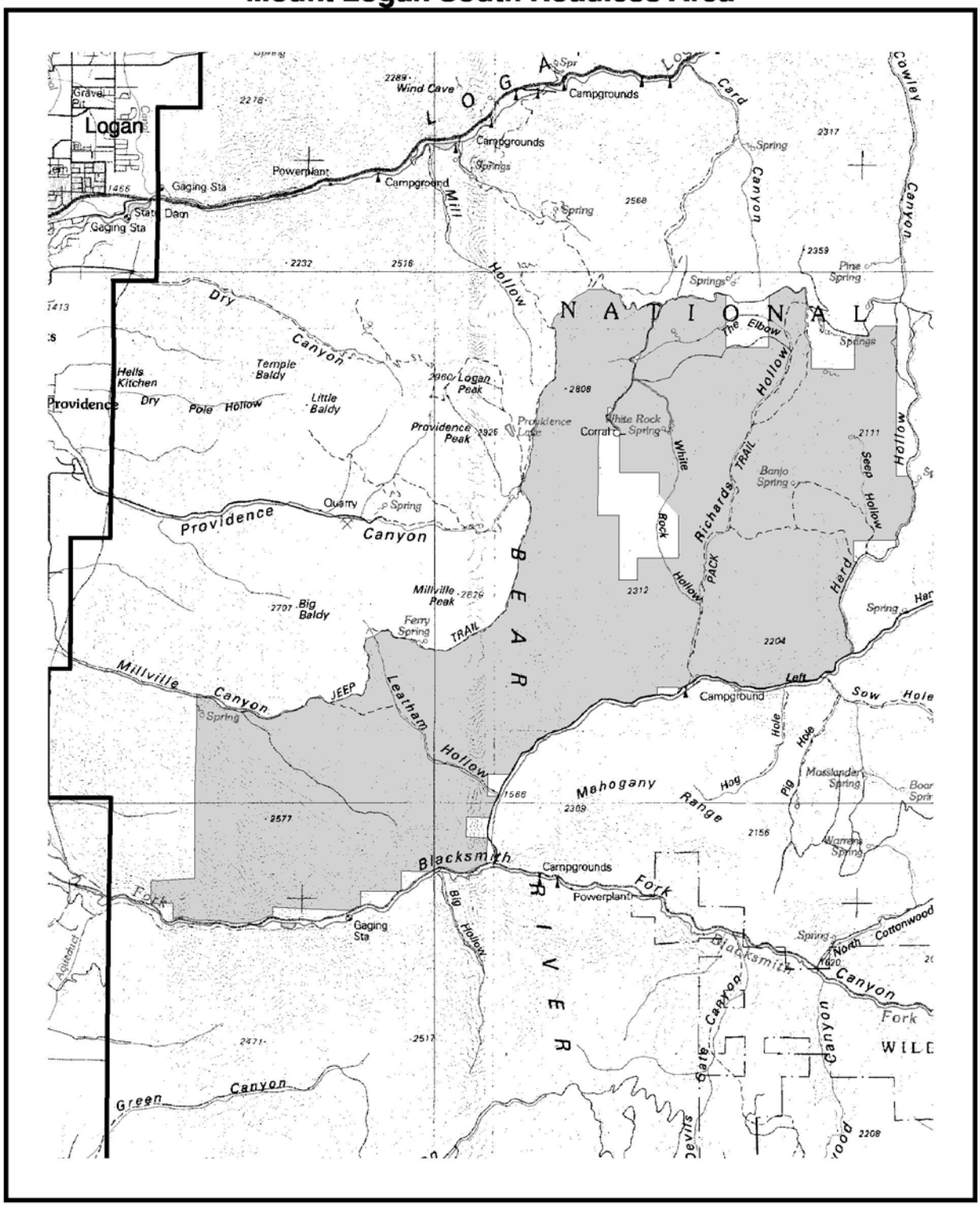
Right Hand Fork Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 15,011 Acres

Mount Logan North Roadless Area



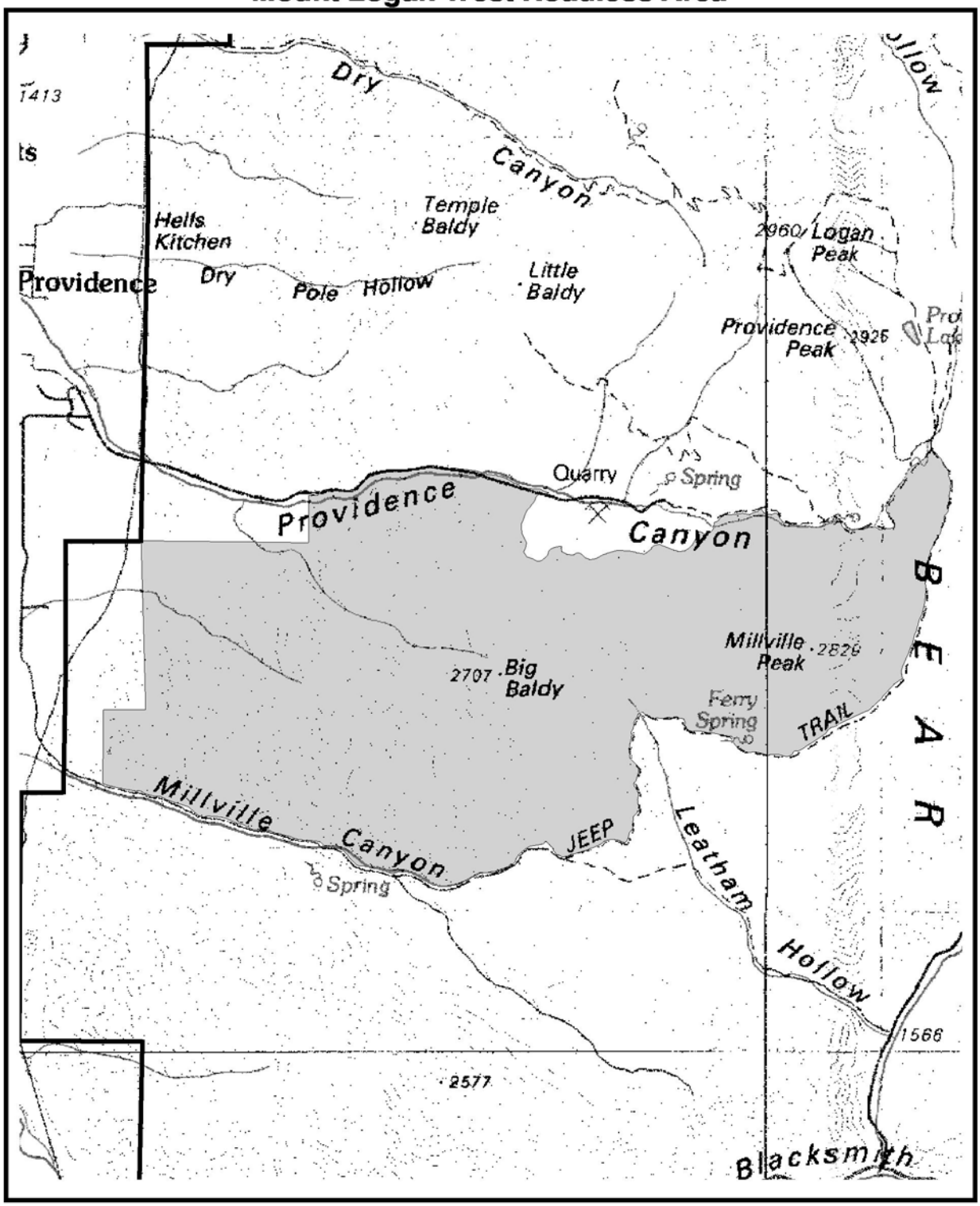
Mount Logan North Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 19,197 Acres

Mount Logan South Roadless Area



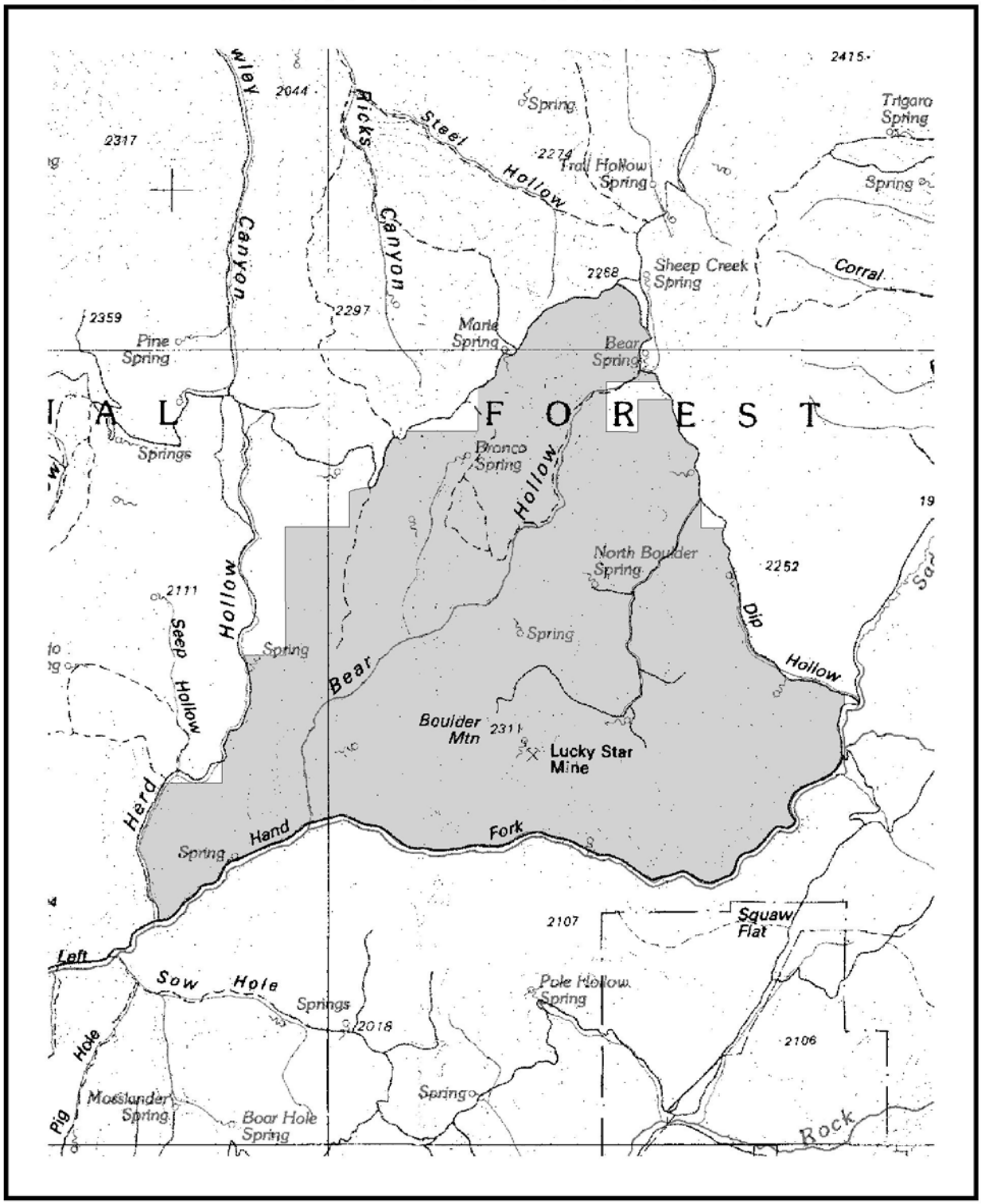
Mount Logan South Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 17,001 Acres

Mount Logan West Roadless Area



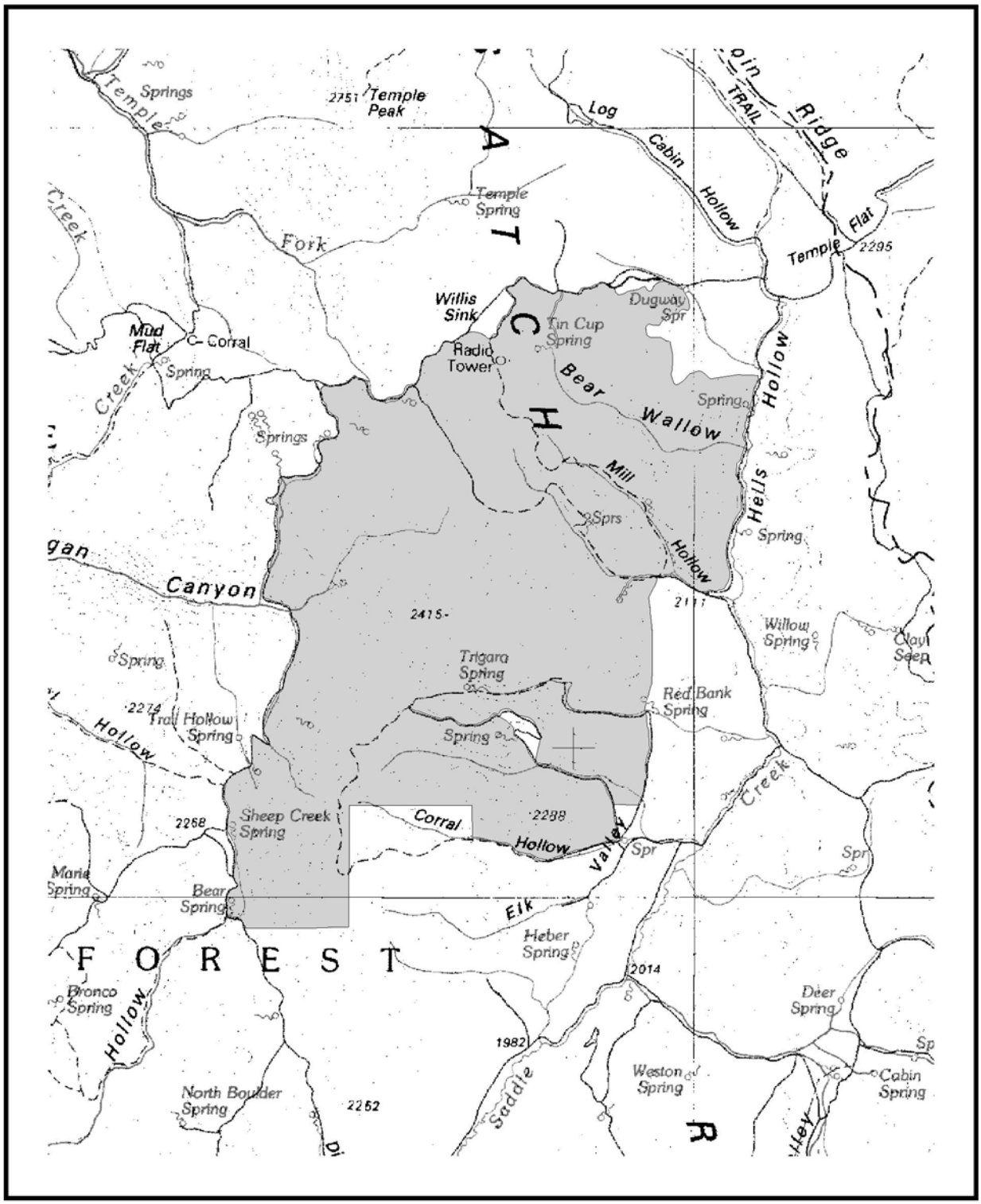
Mount Logan West Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 5,281 Acres

Boulder Mountain Roadless Area



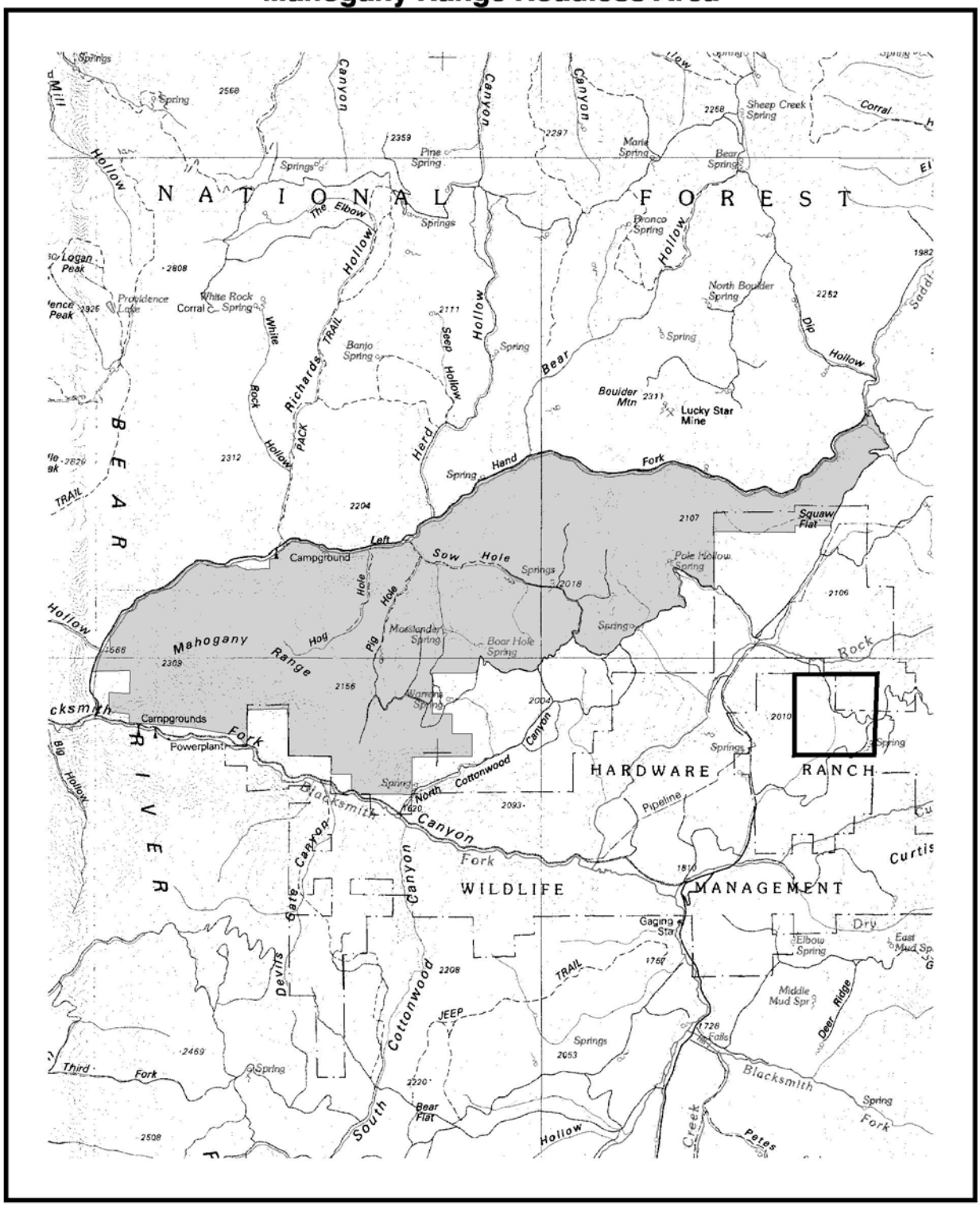
Boulder Mountain Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 8,845 Acres

Elk Valley Roadless Area



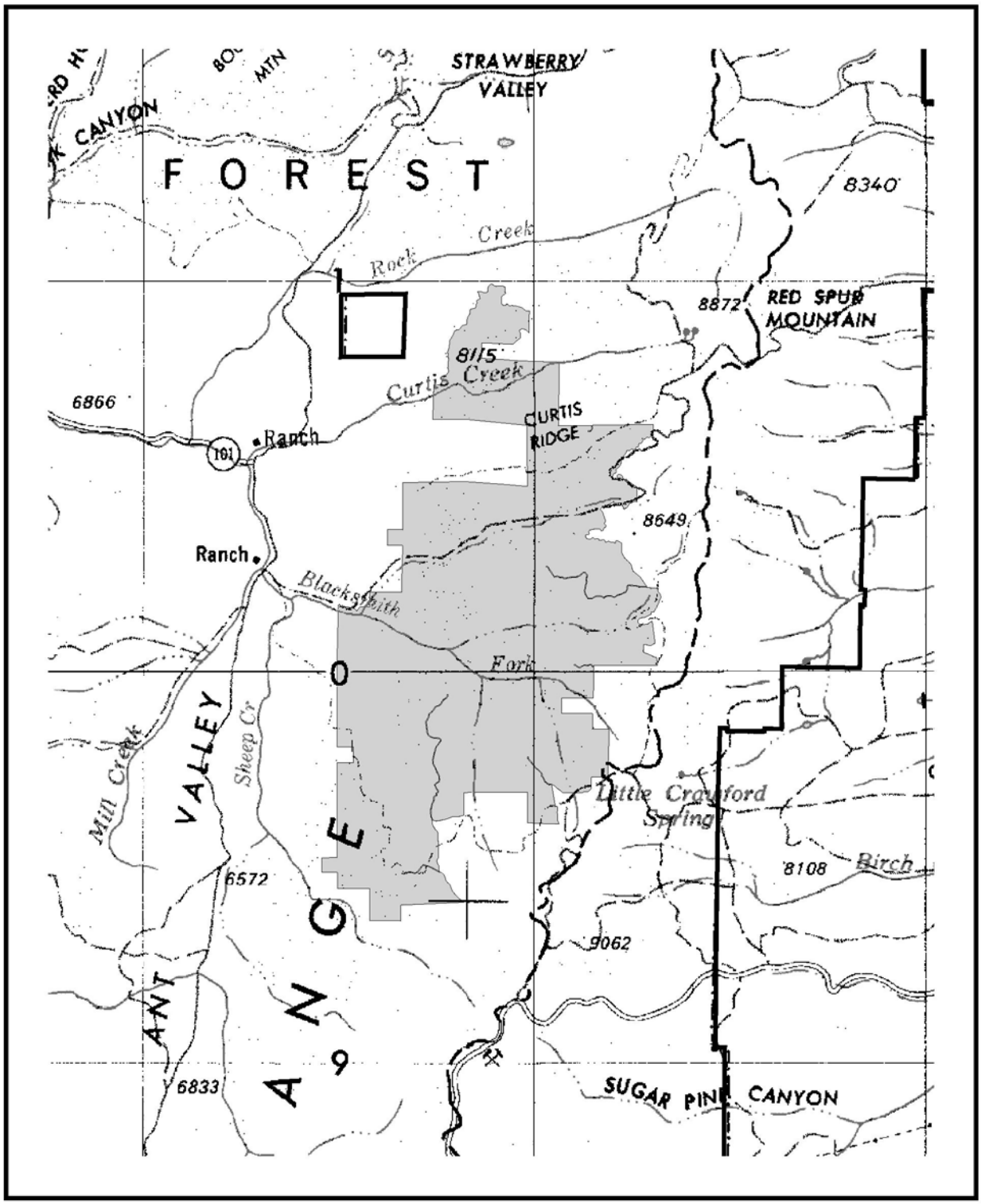
Elk Valley Roadless Area
District: Logan
Management Area: Cache-Box Elder
Size: 8,839 Acres

Mahogany Range Roadless Area



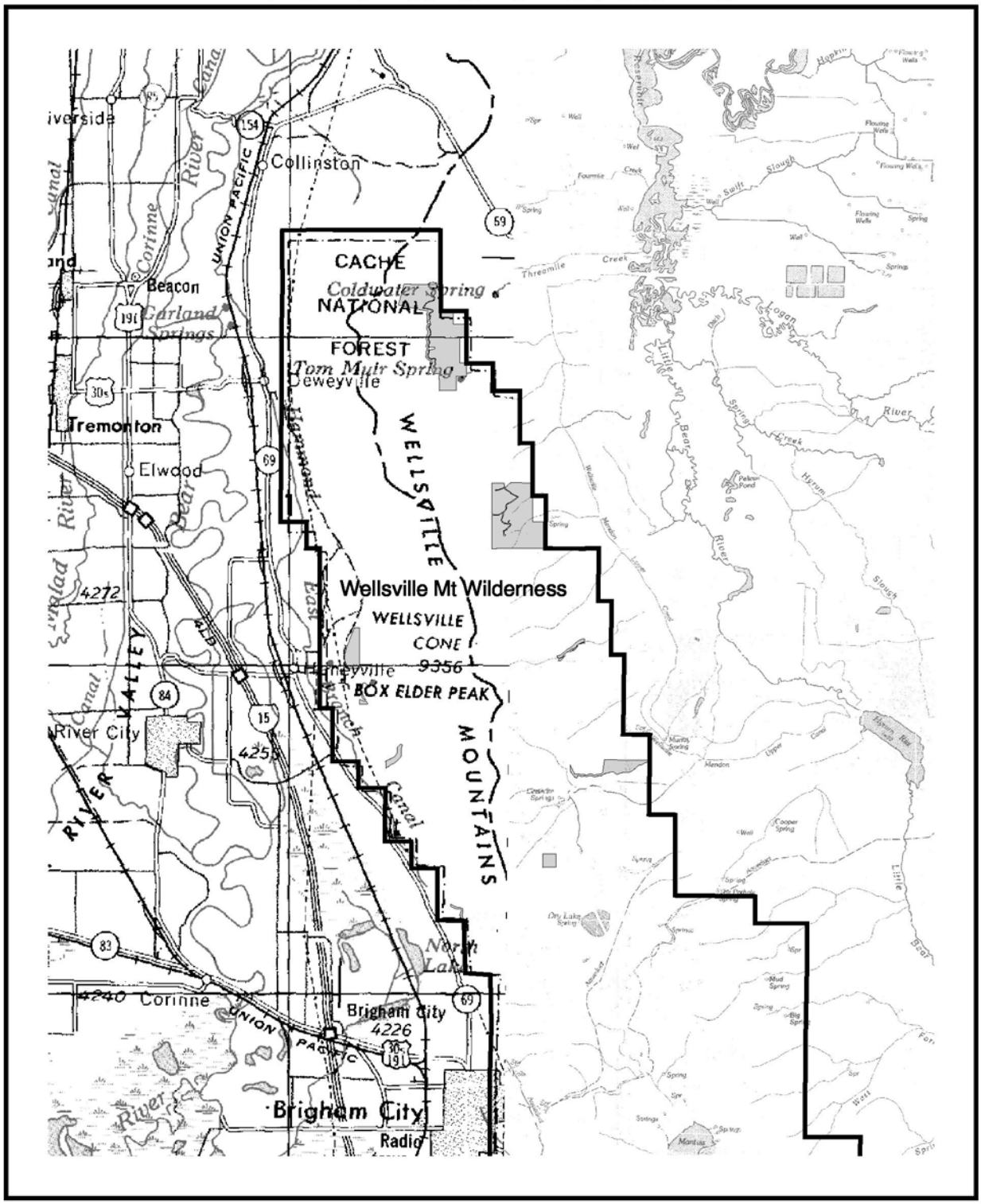
Mahogany Range Roadless Area
District: Logan
Management Area: Cache - Box Elder
Size: 11,400 Acres

Mollens Hollow Roadless Area



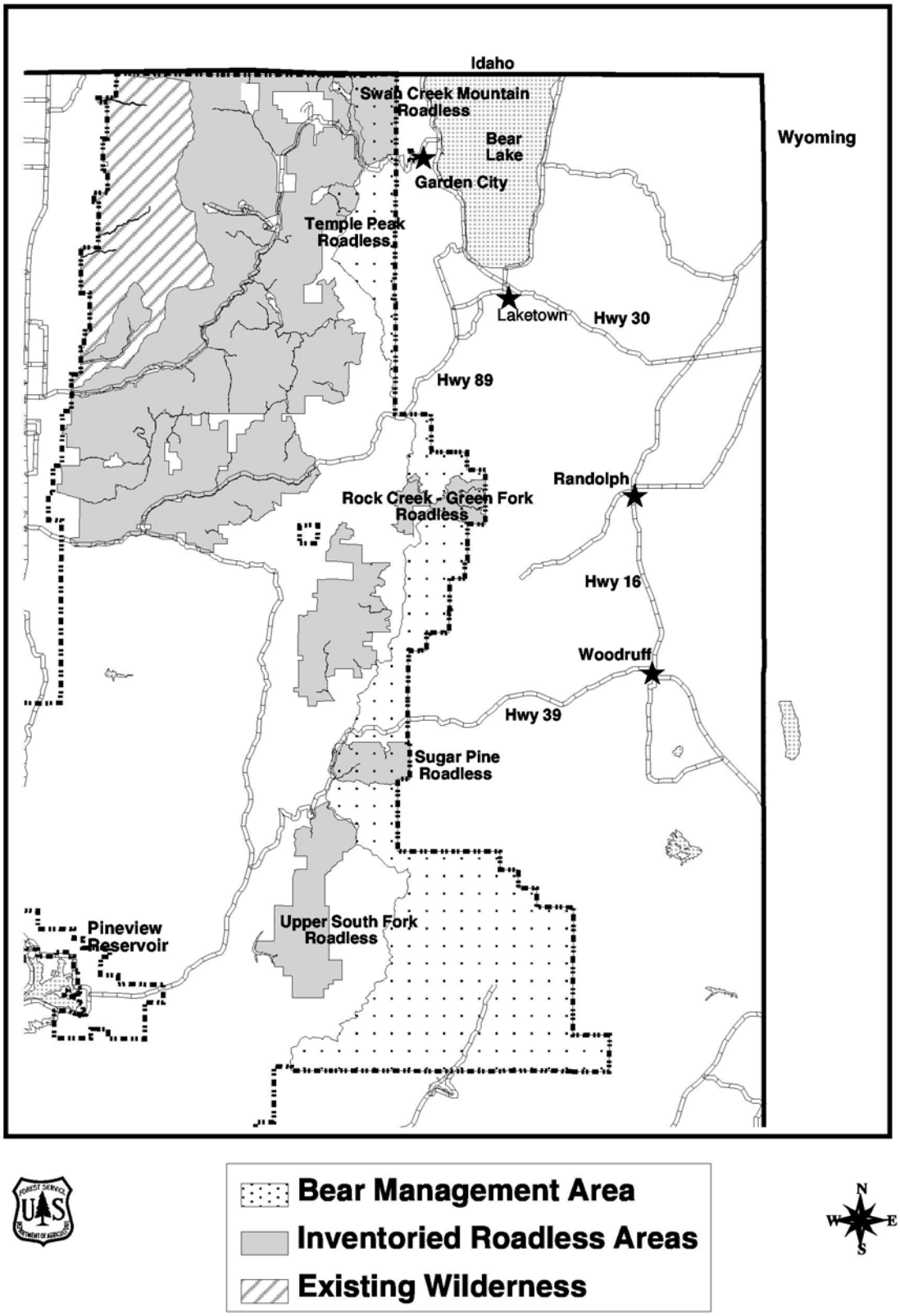
Mollens Hollow Roadless Area
District: Ogden
Management Area: Cache - Box Elder
Size: 17,676 Acres

Wellsville Mountains Roadless Area

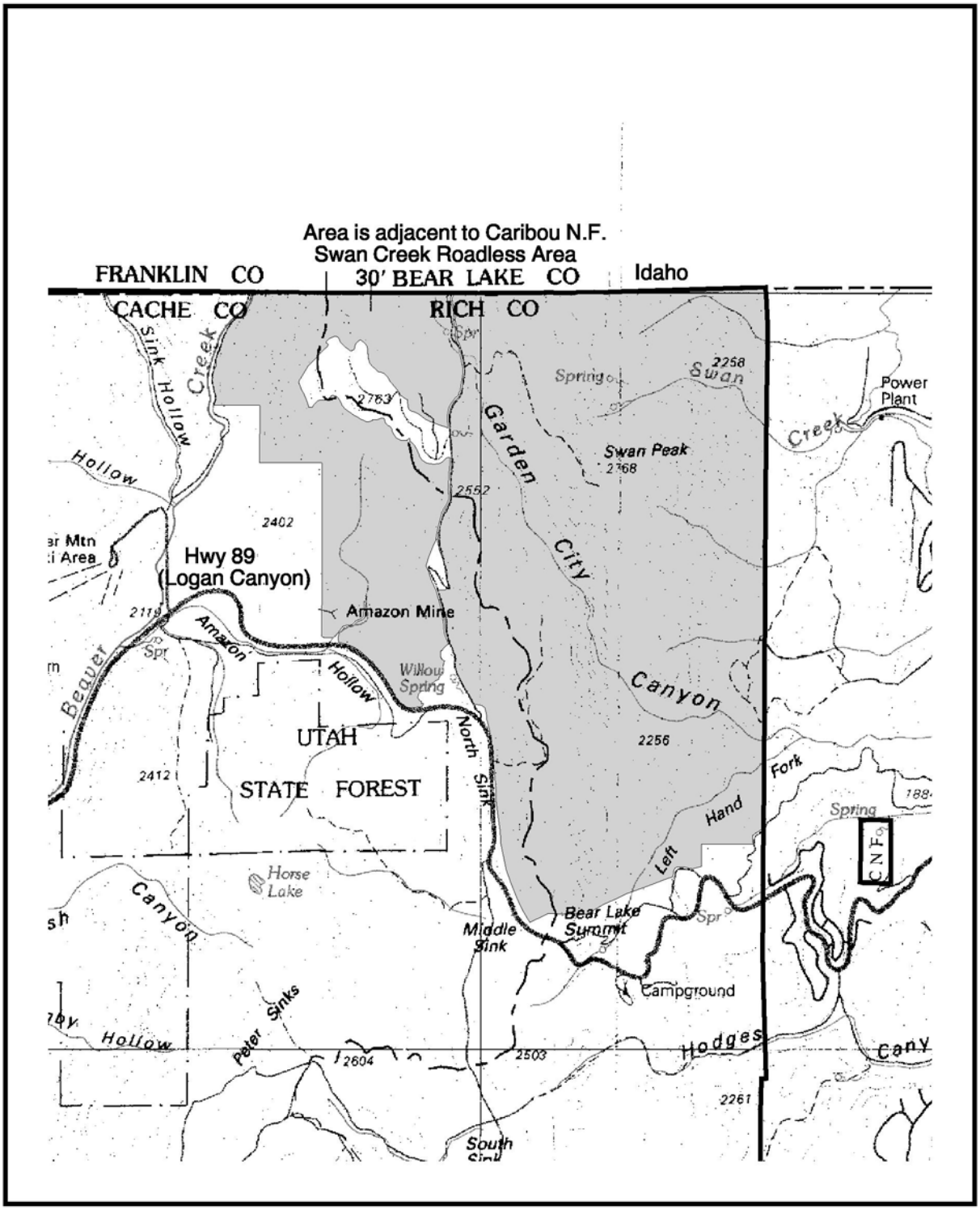


Wellsville Mountains Roadless Area
District: Logan
Geographic Area: Cache - Box Elder
Size: 1,763 Acres

Bear Management Area Roadless Areas

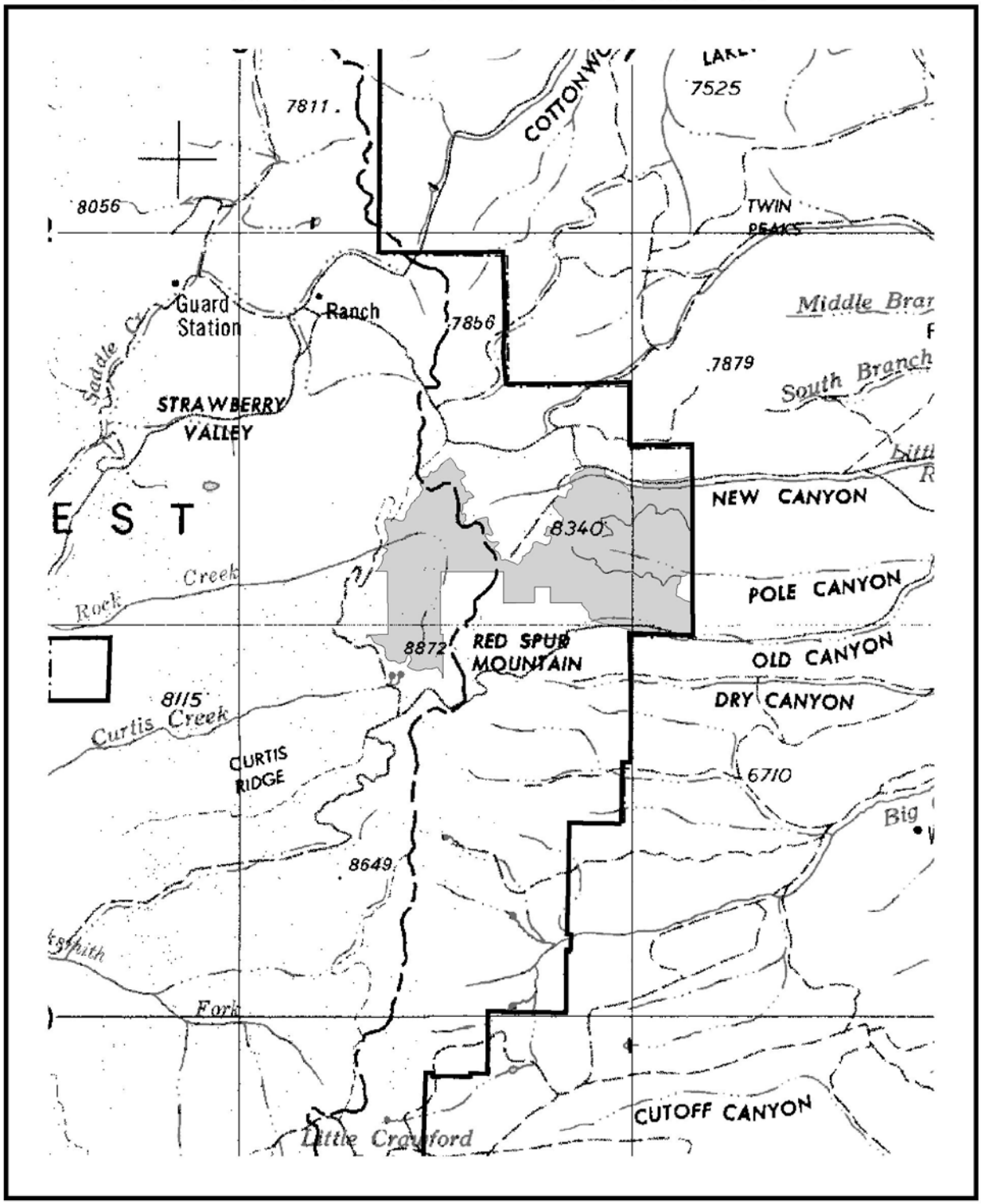


Swan Creek Roadless Area



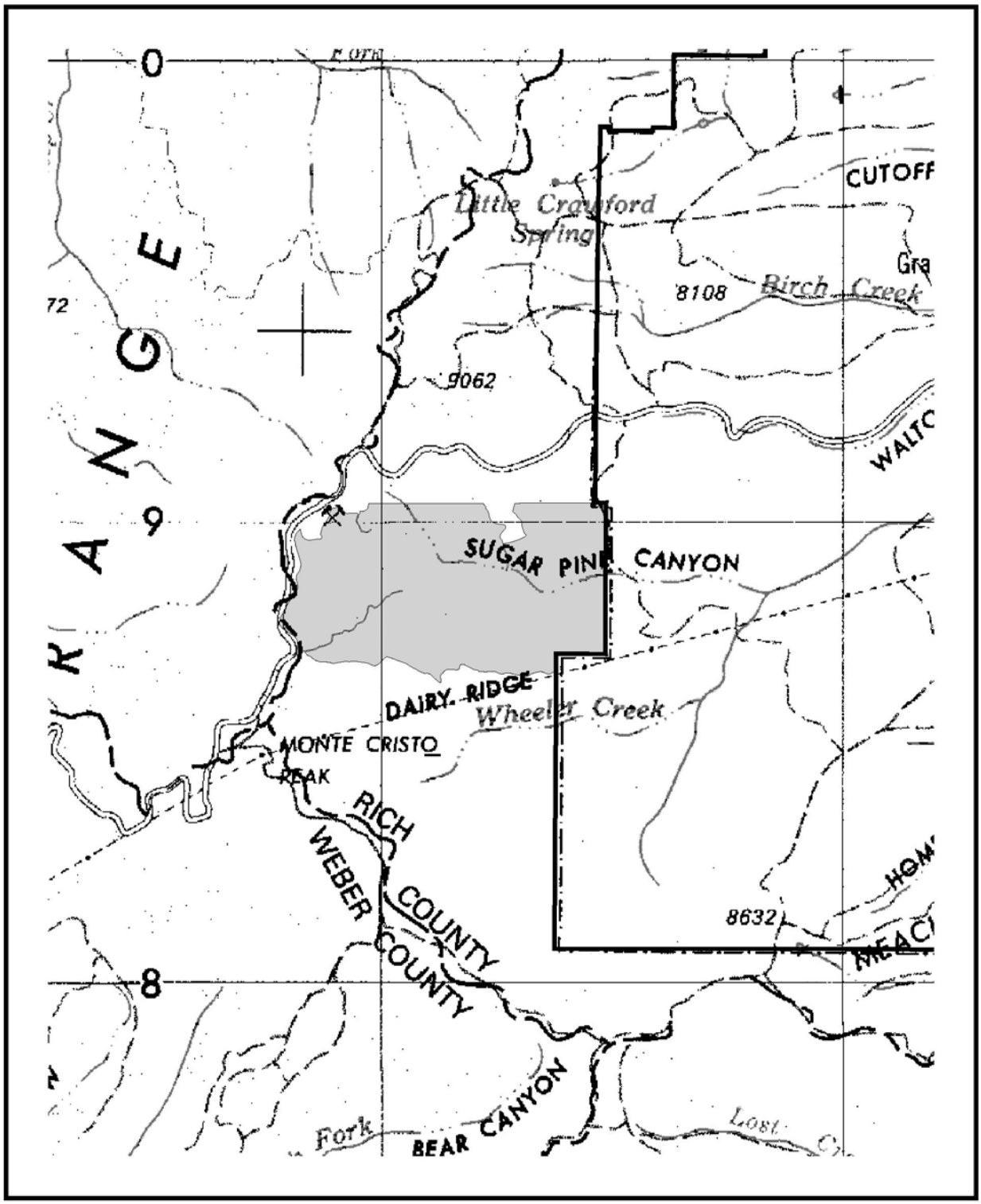
Swan Creek Roadless Area
District: Logan
Management Area: Bear
Size: 9,384 Acres

Rock Creek - Green Fork Roadless Area



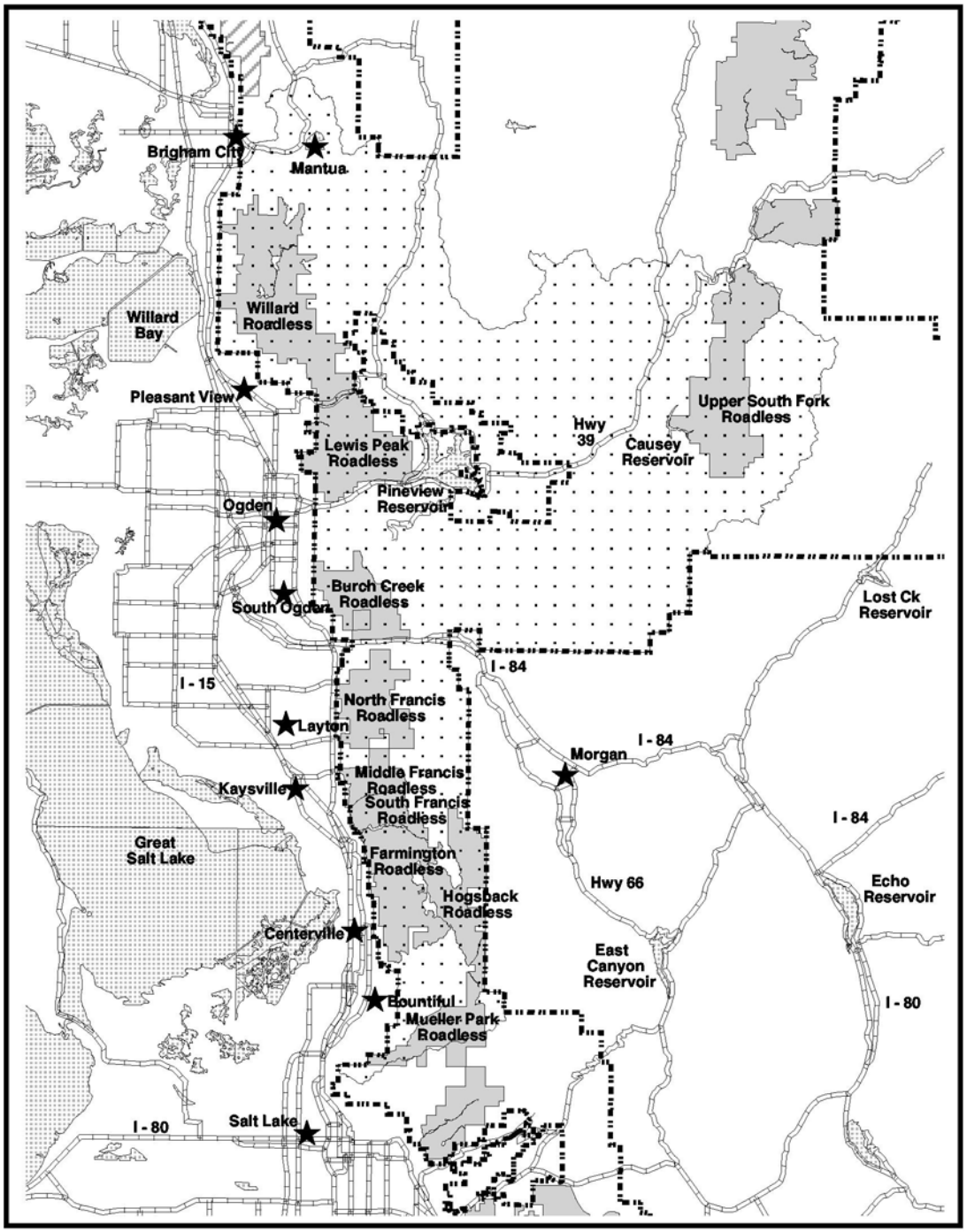
Rock Creek - Green Fork Roadless Area
District: Ogden
Management Area: Cache-Box Elder/Bear
Size: 5,651 Acres

Sugar Pine Roadless Area



Sugar Pine Roadless Area
District: Ogden
Management Area: Bear
Size: 5,591 Acres

North Wasatch/Ogden Valley Management Area Roadless Areas

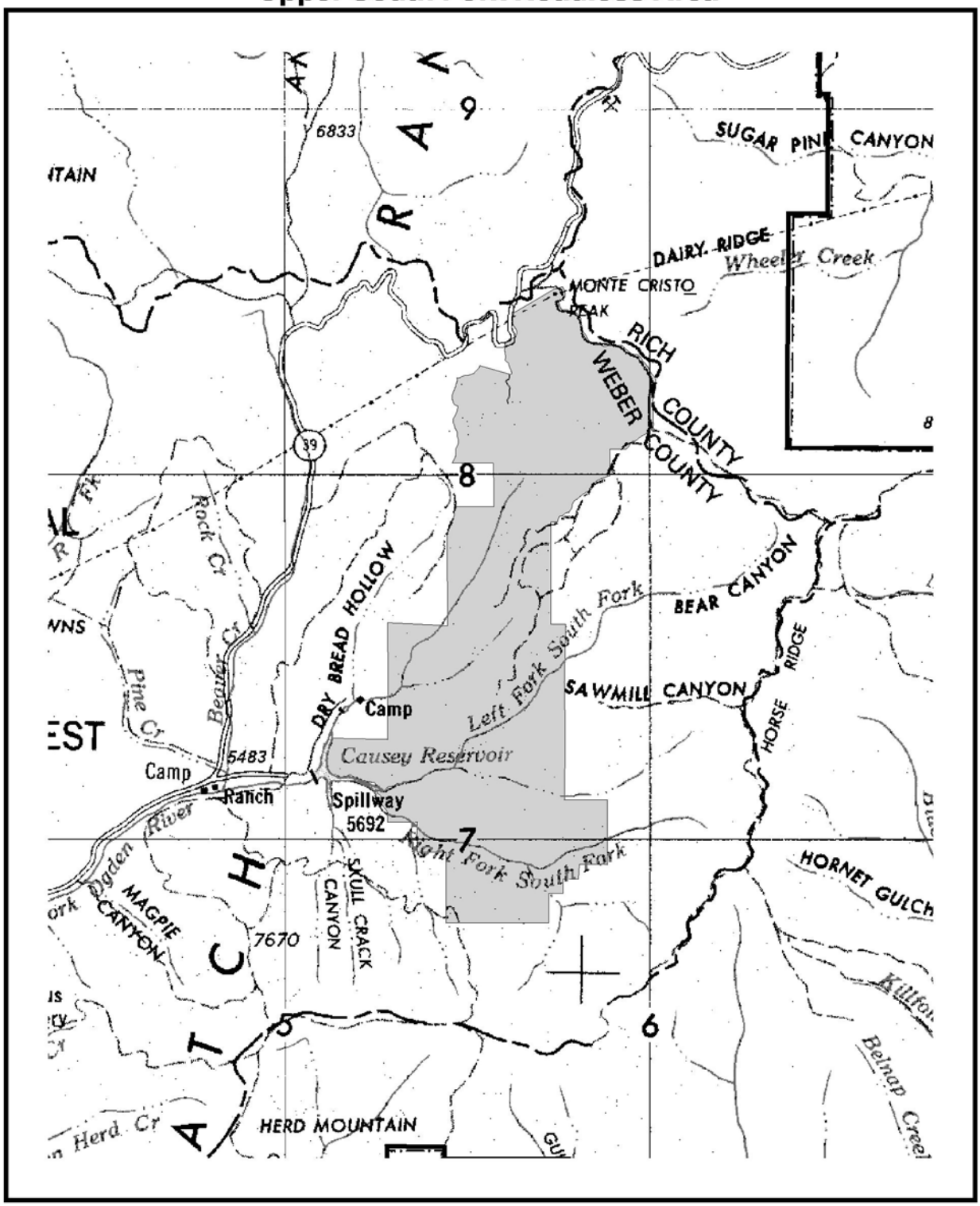


North Wasatch/Ogden Valley Management Area

Inventoried Roadless Areas

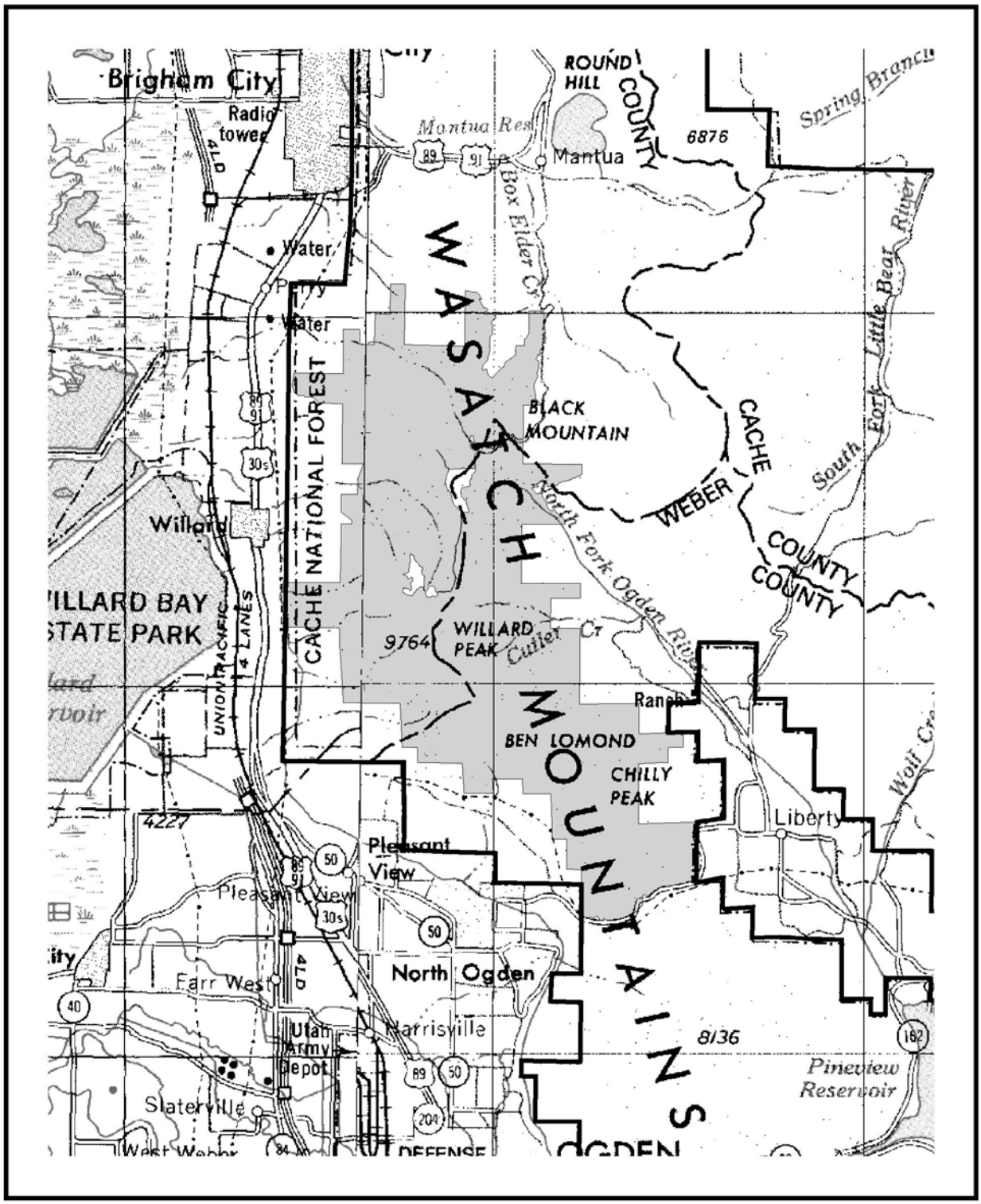
Existing Wilderness

Upper South Fork Roadless Area



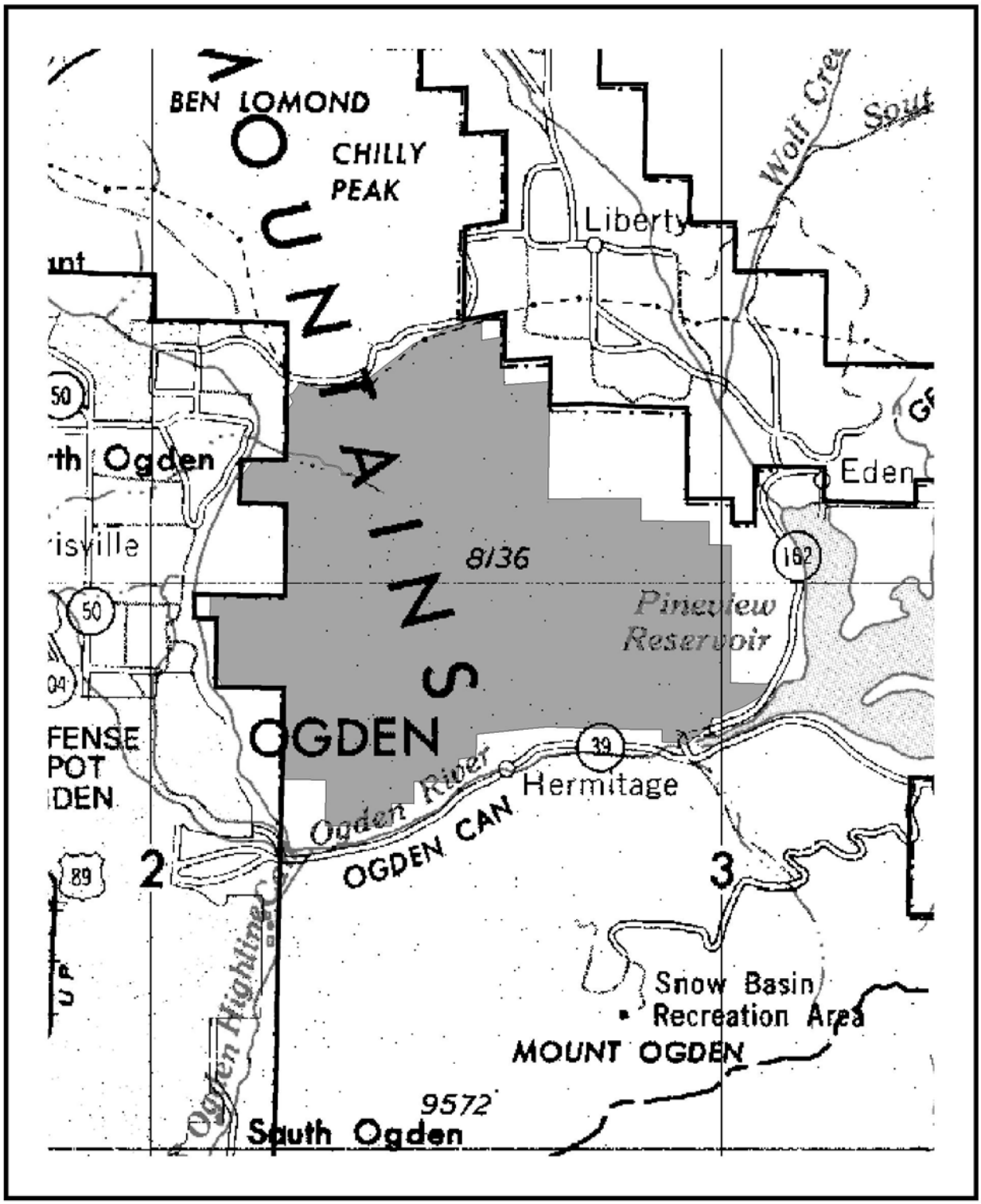
Upper South Fork Roadless Area
District: Ogden
Management Area: North Wasatch - Ogden Valley
Size: 17,255 Acres

Willard Roadless Area



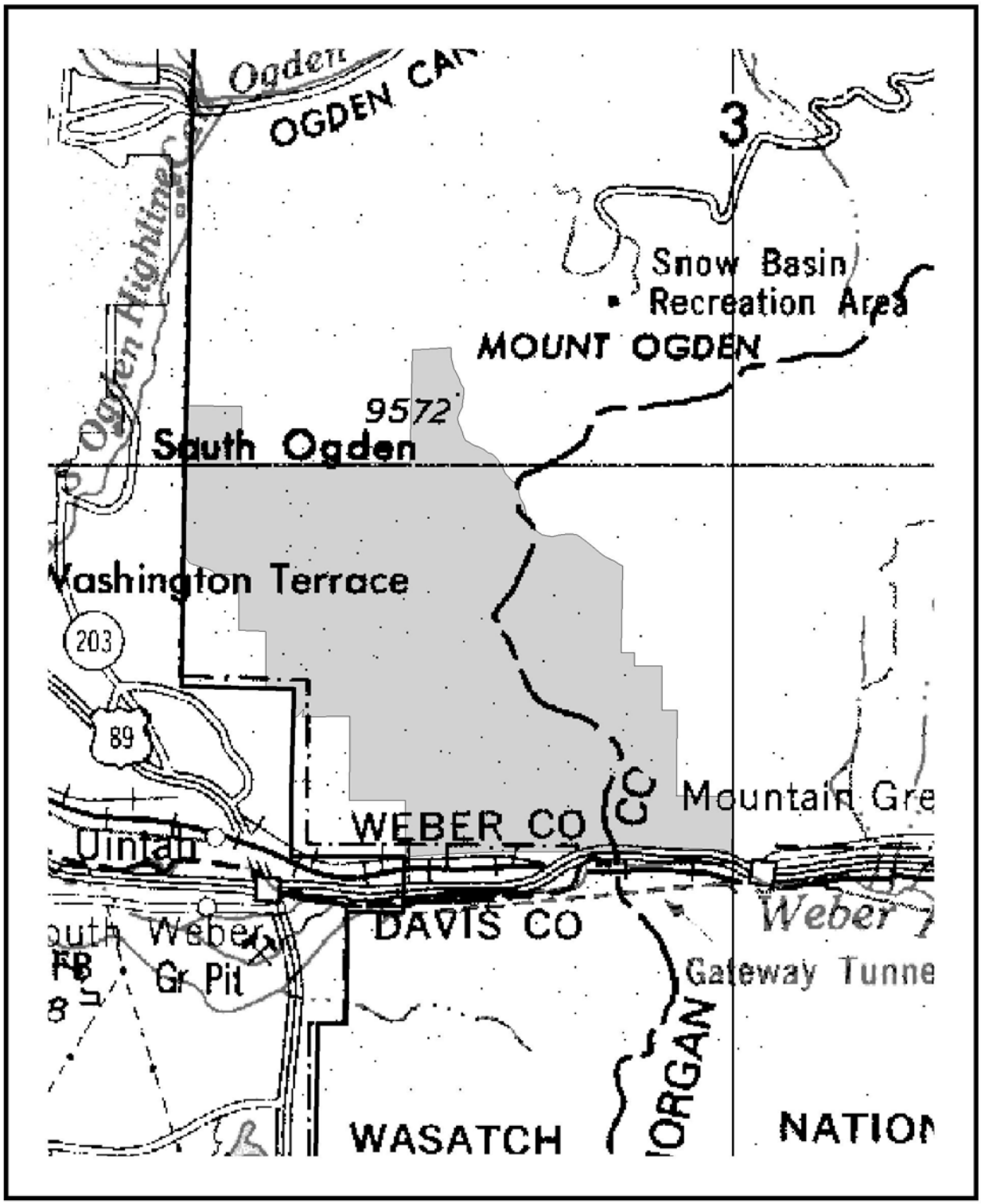
Willard Roadless Area
District: Ogden
Management Area: North Wastach - Ogden Valley
Size: 20,011 Acres

Lewis Peak Roadless Area



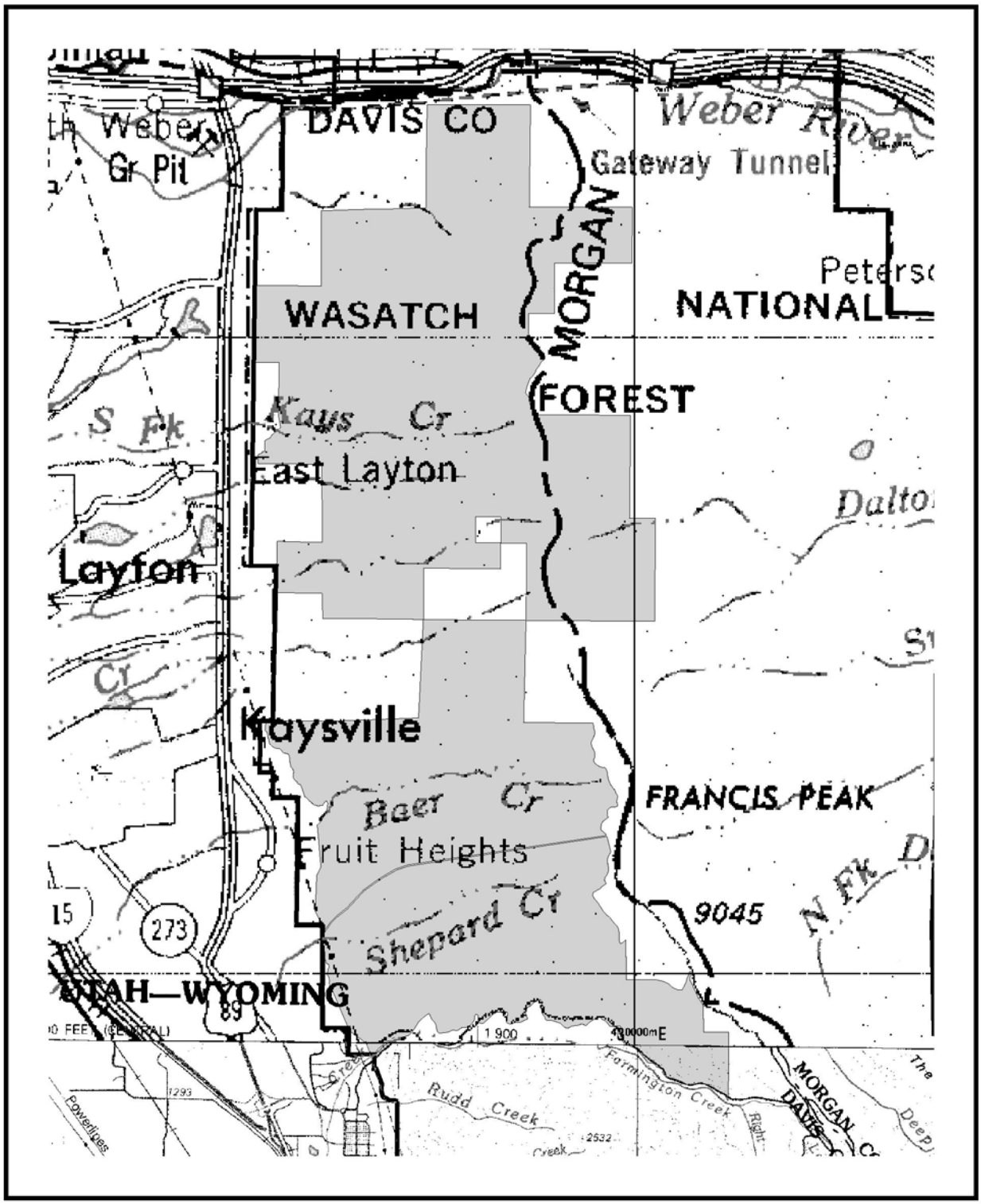
Lewis Peak Roadless Area
District: Ogden
Management Area: North Wastach - Ogden
Size: 12,092 Acres

Burch Creek Roadless Area



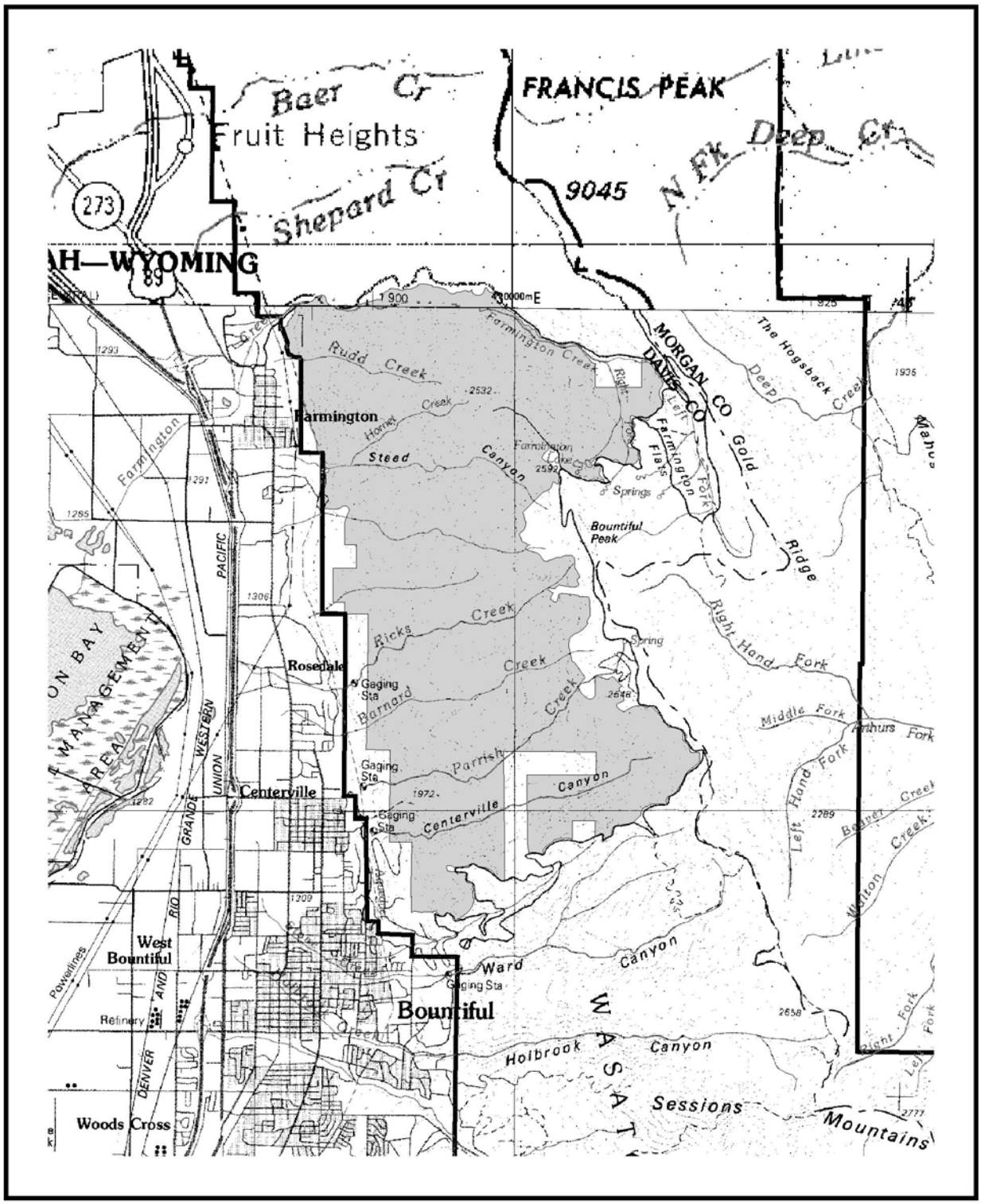
Burch Creek Roadless Area
District: Ogden
Management Area: North Wasatch - Ogden Valley
Size: 7,518 Acres

Francis Roadless Area



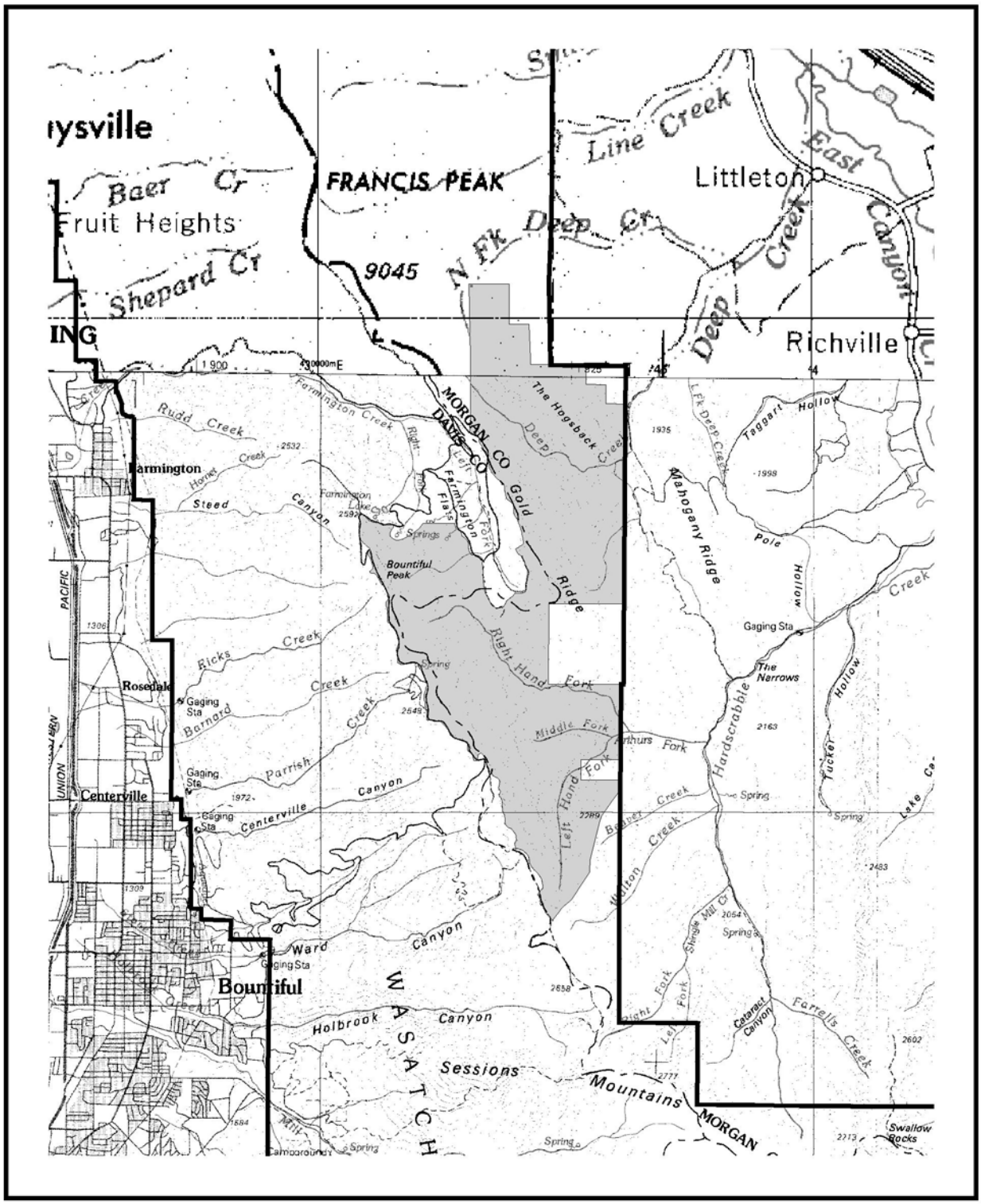
Francis Roadless Area
District: Salt Lake
Management Area: North Wasatch/Ogden Valley
Size: 14,769 Acres

Farmington Roadless Area



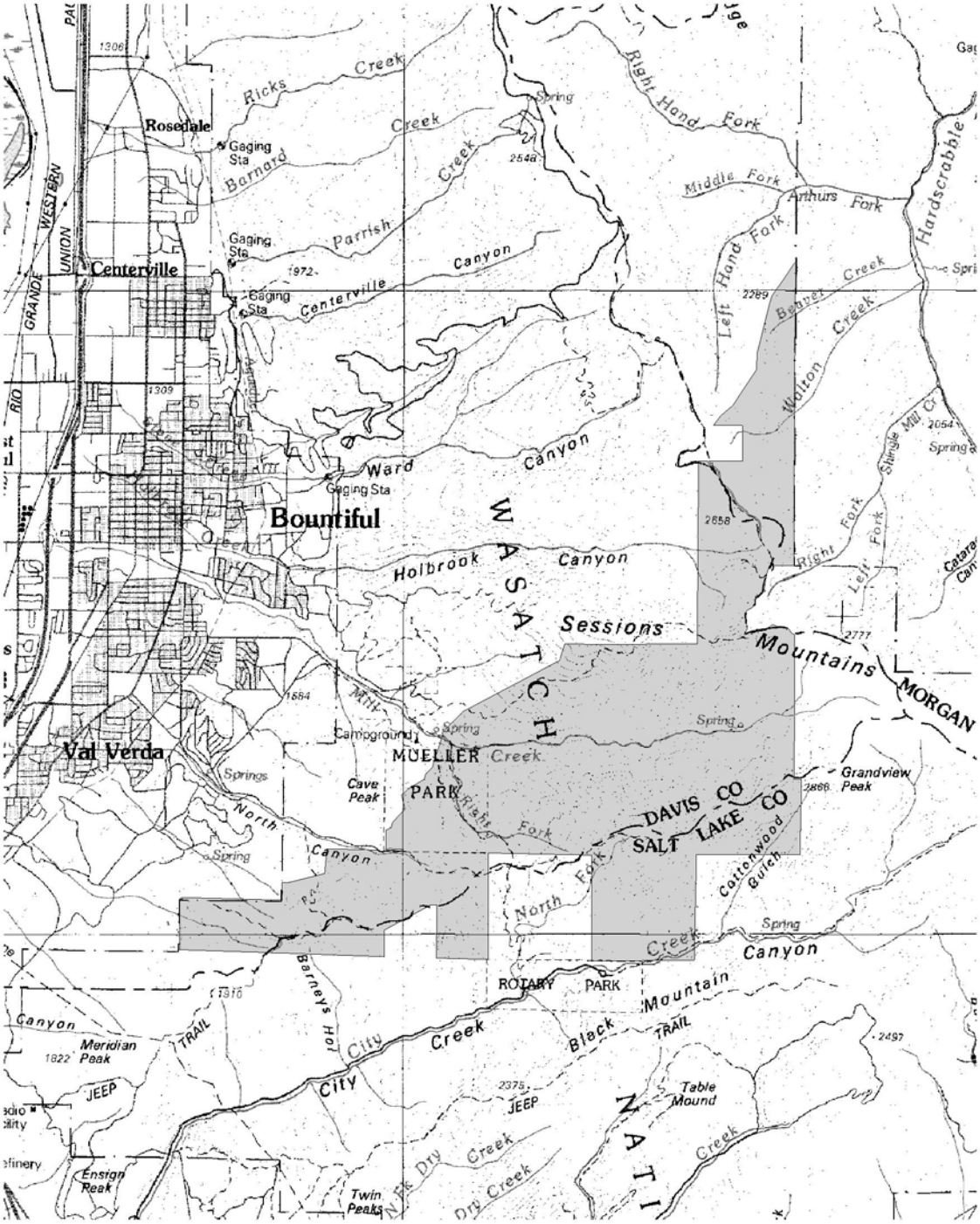
Farmington Roadless Area
District: Salt Lake
Management Area: North Wastach/Ogden Valley
Size: 10,946 Acres

Hogsback Roadless Area



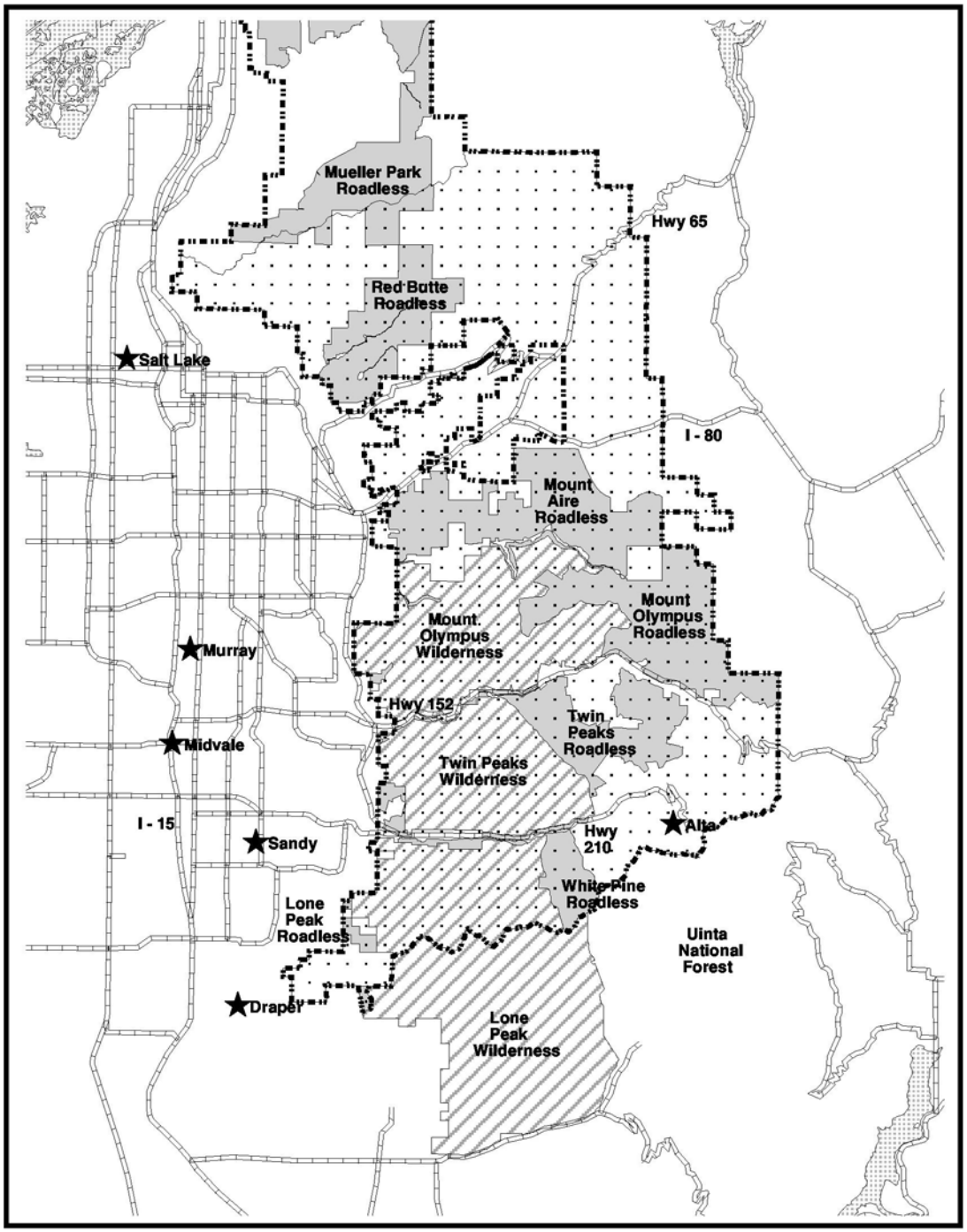
Hogsback Roadless Area
District: Salt Lake
Management Area: North Wasatch/Ogden Valley
Size: 7,931 Acres

Mueller Park Roadless Area



Mueller Park Roadless Area
District: Salt Lake
Management Area: North Wasatch/Ogden Valley & Central Wasatch
Size: 7,752 Acres

Central Wasatch Management Area Roadless Areas

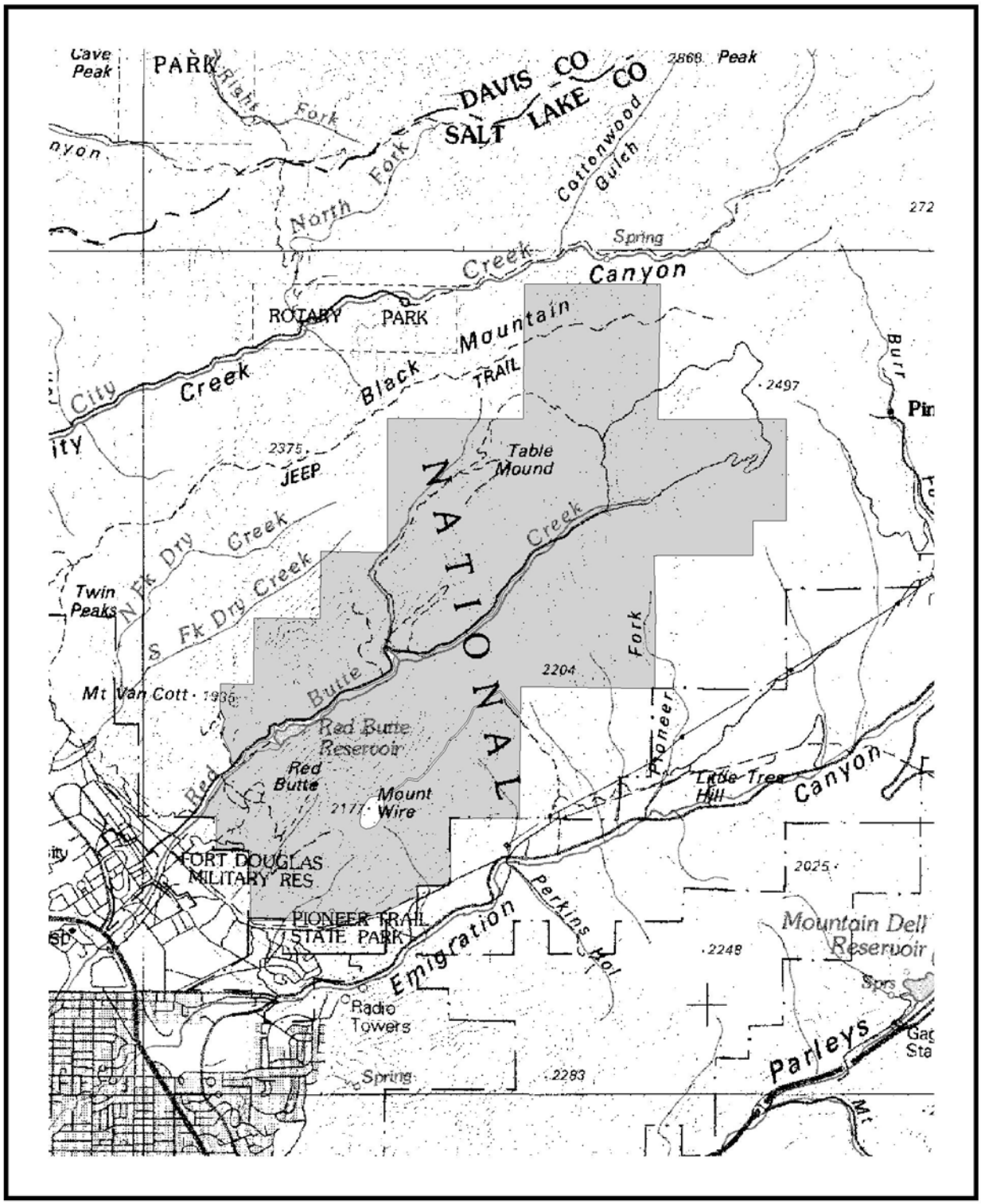


Central Wasatch Management Unit

Inventoried Roadless Areas

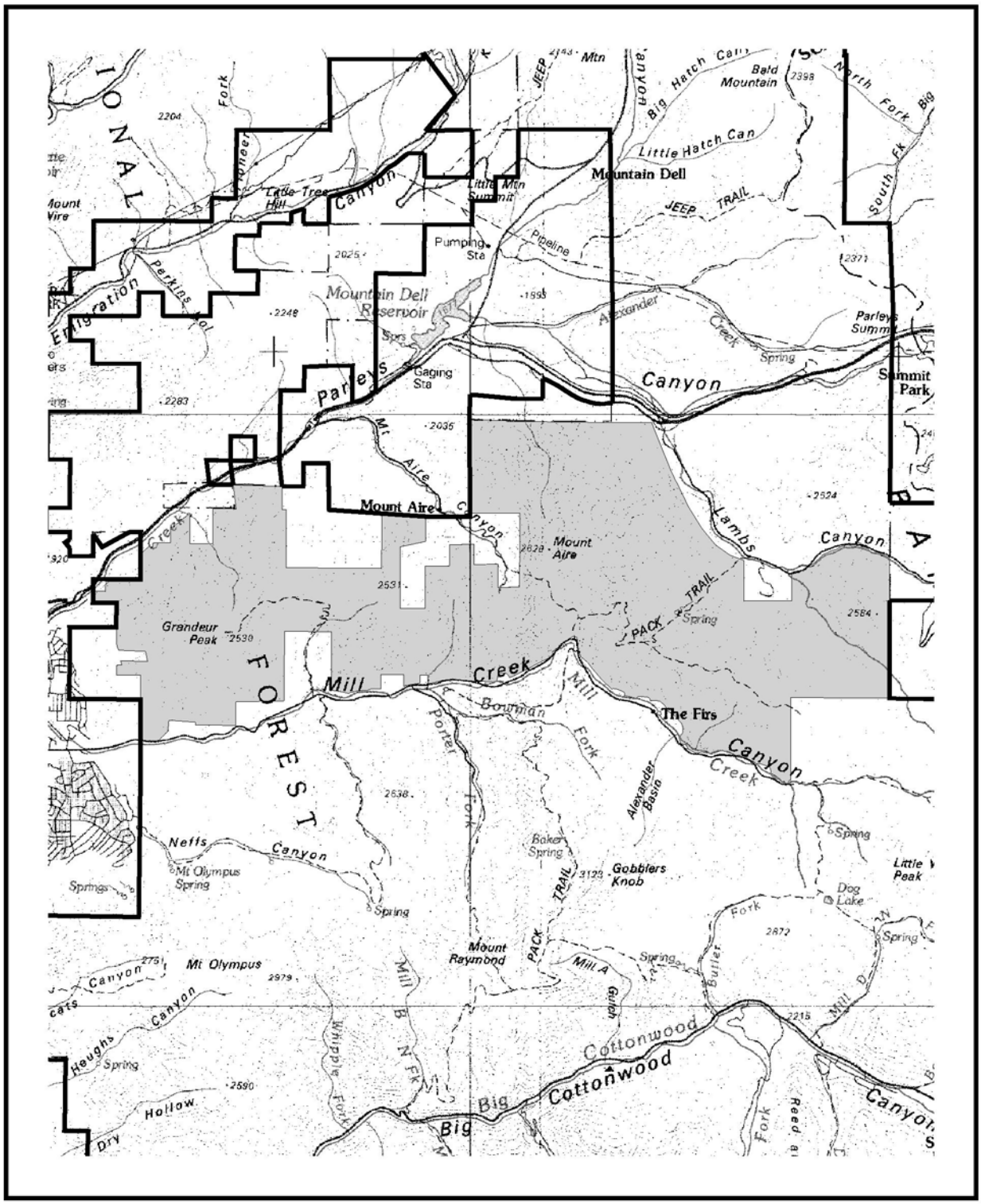
Existing Wilderness

Red Butte Roadless Area



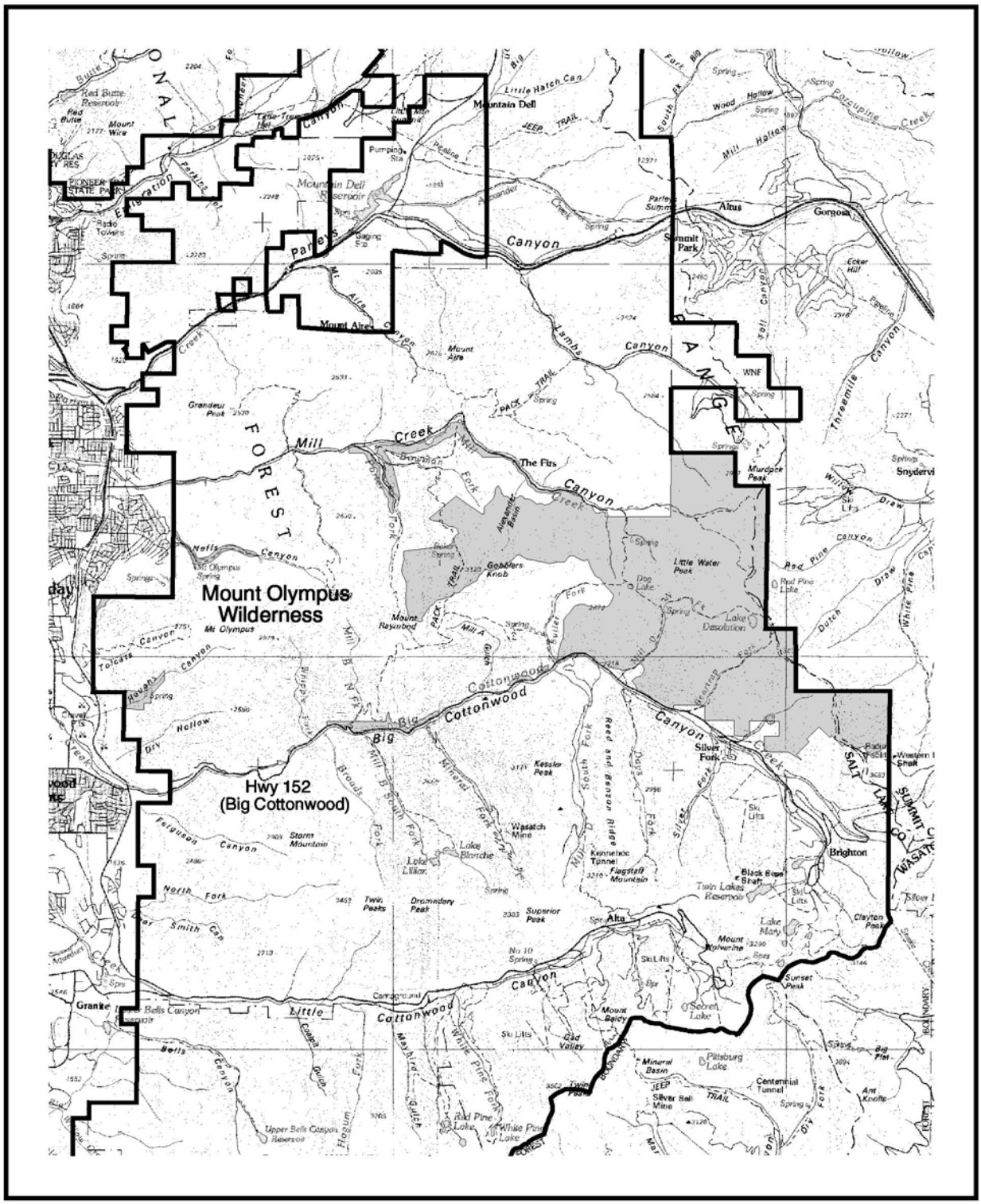
Red Butte Roadless Area
District: Salt Lake
Management Area: Central Wasatch
Size: 6,159 Acres

Mount Aire Roadless Area



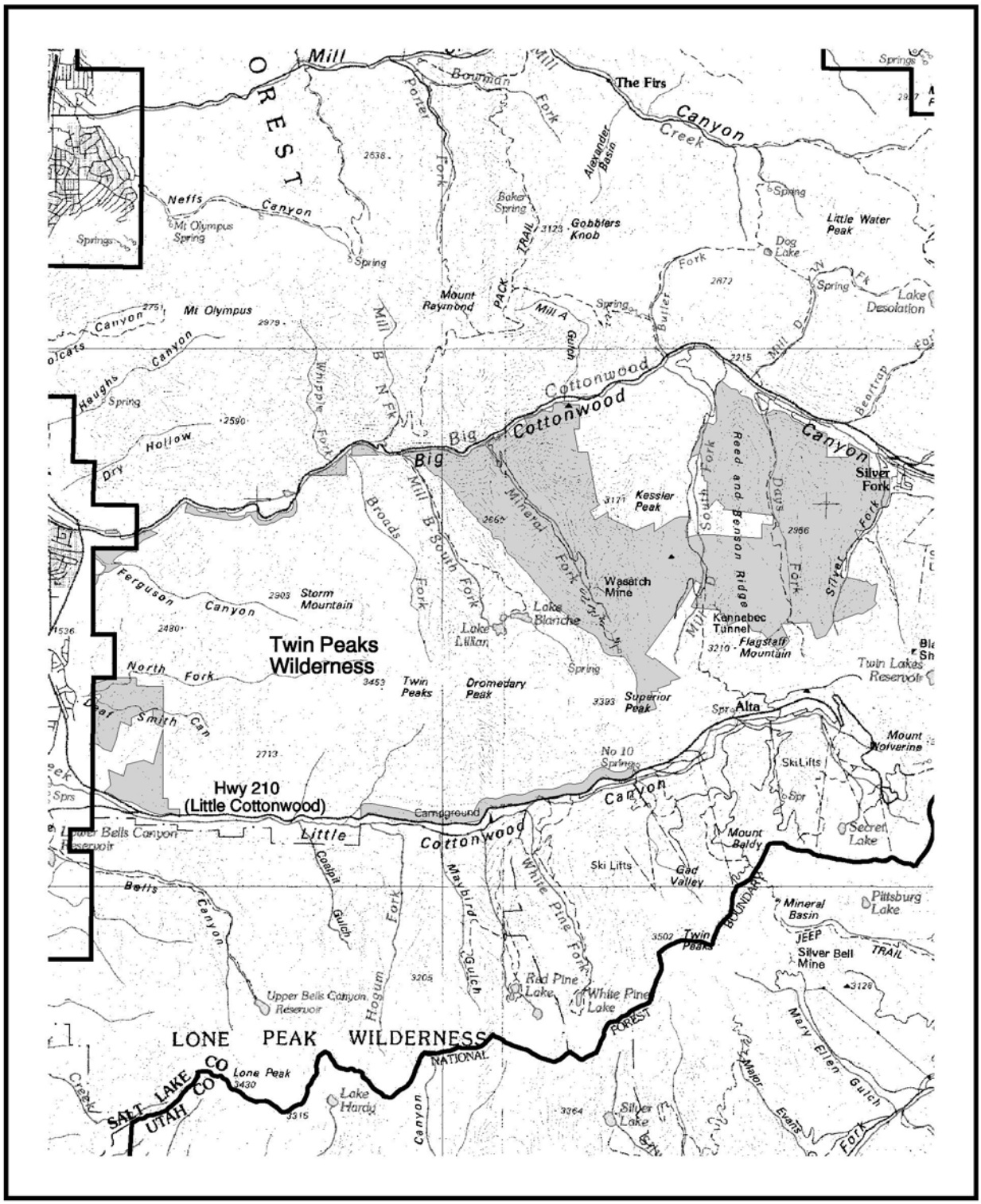
Mount Aire Roadless Area
District: Salt Lake
Management Area: Central Wasatch
Size: 9,701 Acres

Mount Olympus Roadless Area



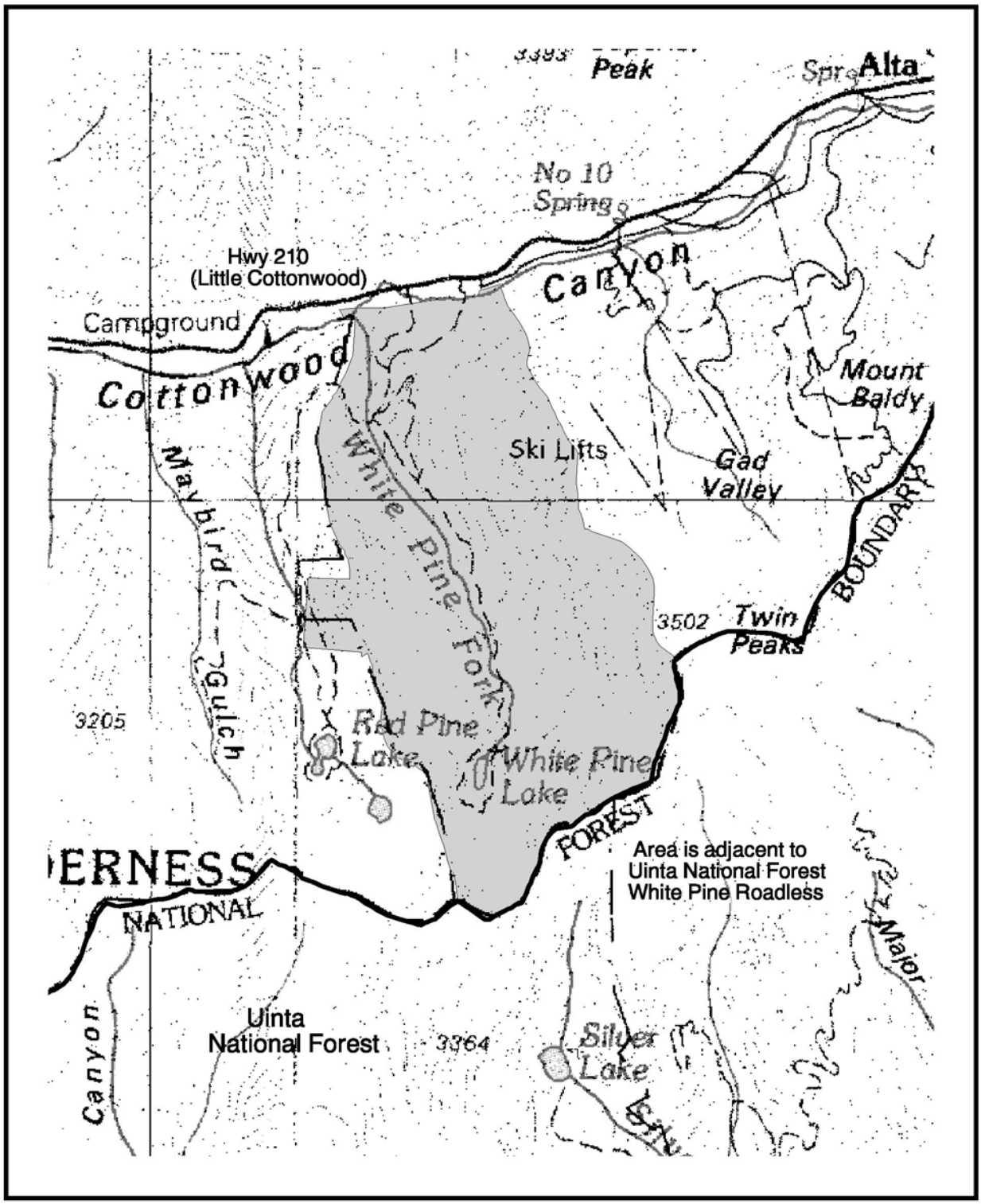
▨ **Mount Olympus Roadless Area**
District: Salt Lake
Management Area: Central Wasatch
Size: 10,139 Acres

Twin Peaks Roadless Area



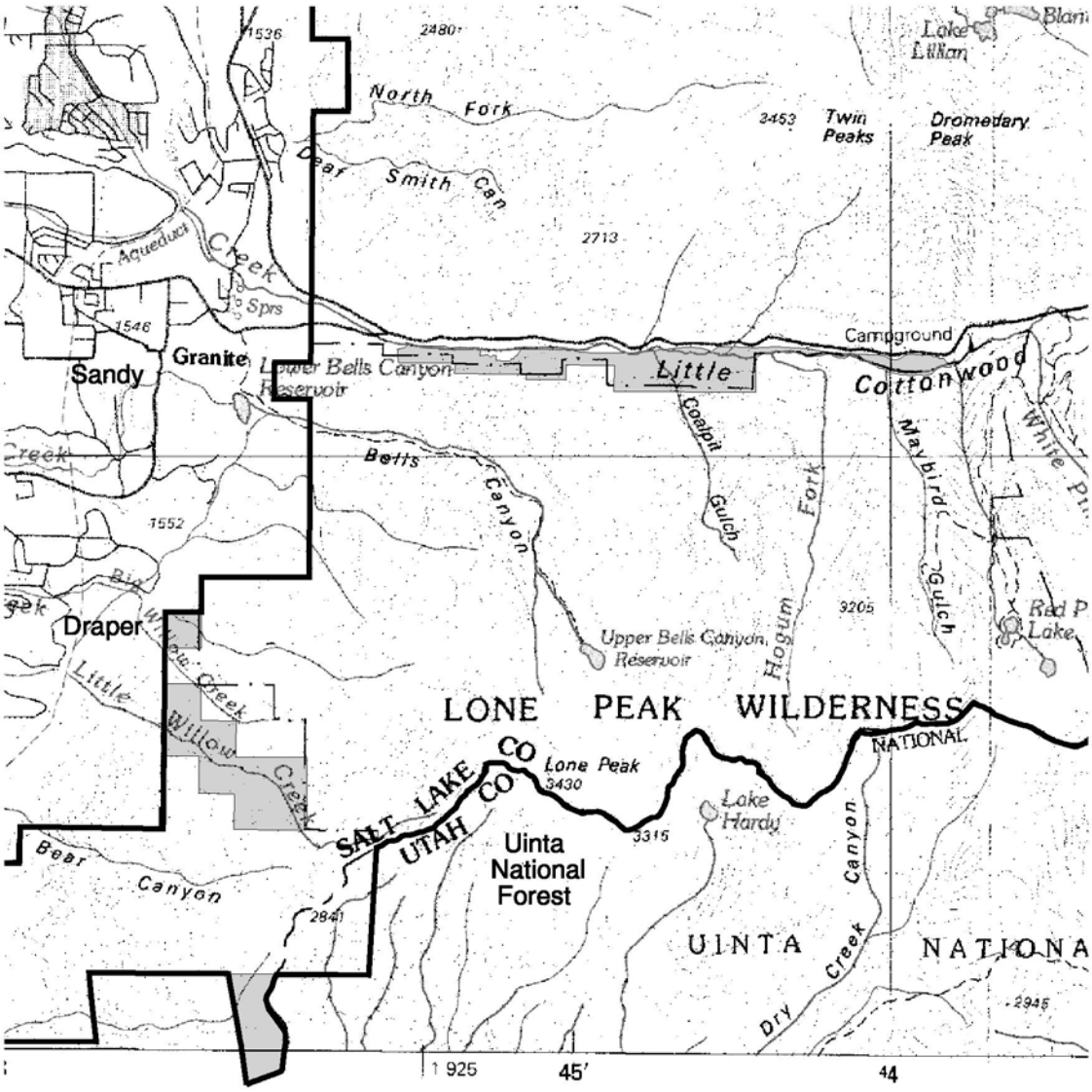
Twin Peaks Roadless Area
District: Salt Lake
Management Area: Central Wasatch
Size: 6,490 Acres

White Pine Roadless Area



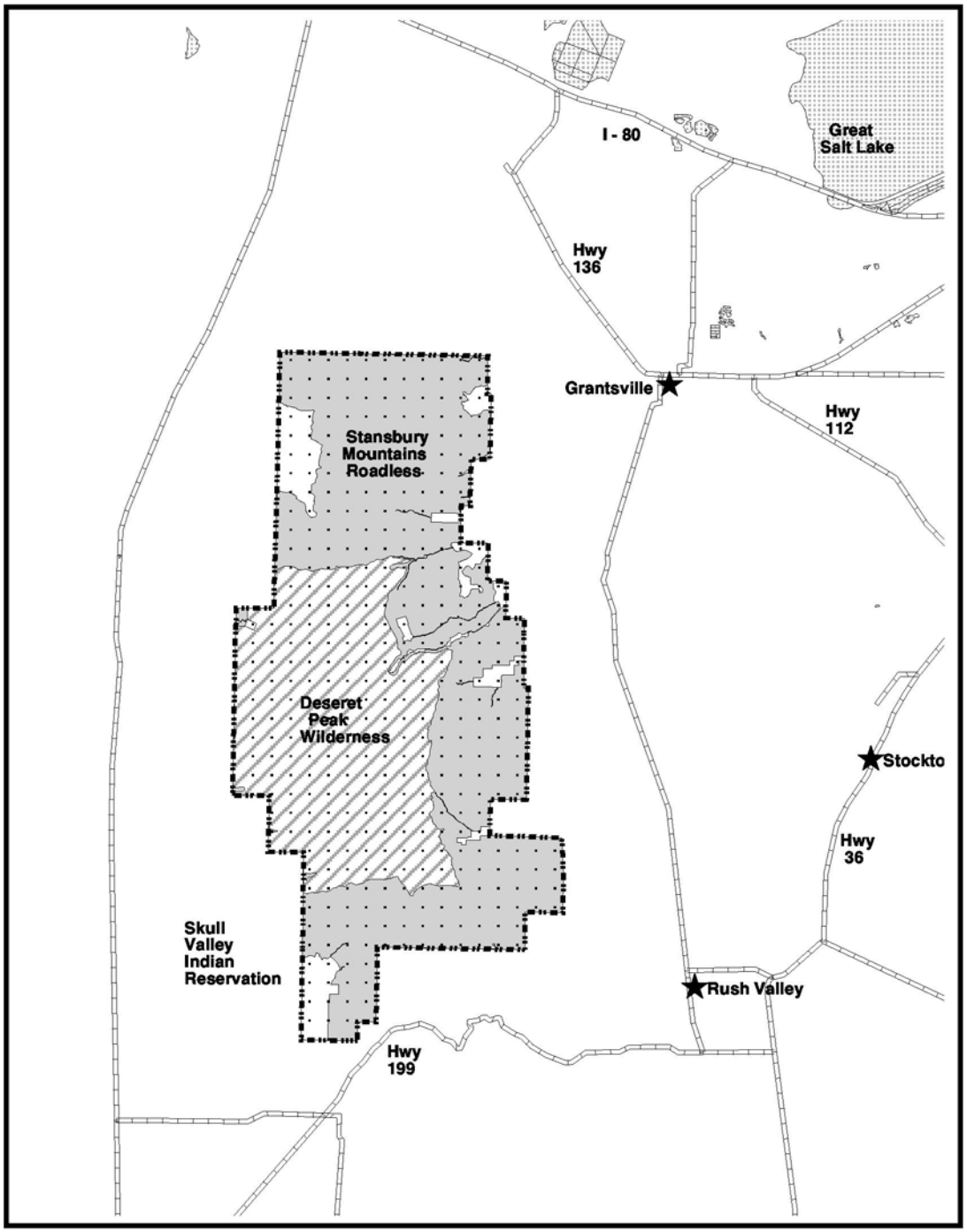
White Pine Roadless Area
District: Salt Lake
Management Area: Central Wasatch
Size: 2,059 Acres

Lone Peak Roadless Area



Lone Peak Roadless Area
District: Salt Lake
Management Area: Central Wasatch
Size: 874 Acres (adjacent to existing wilderness)

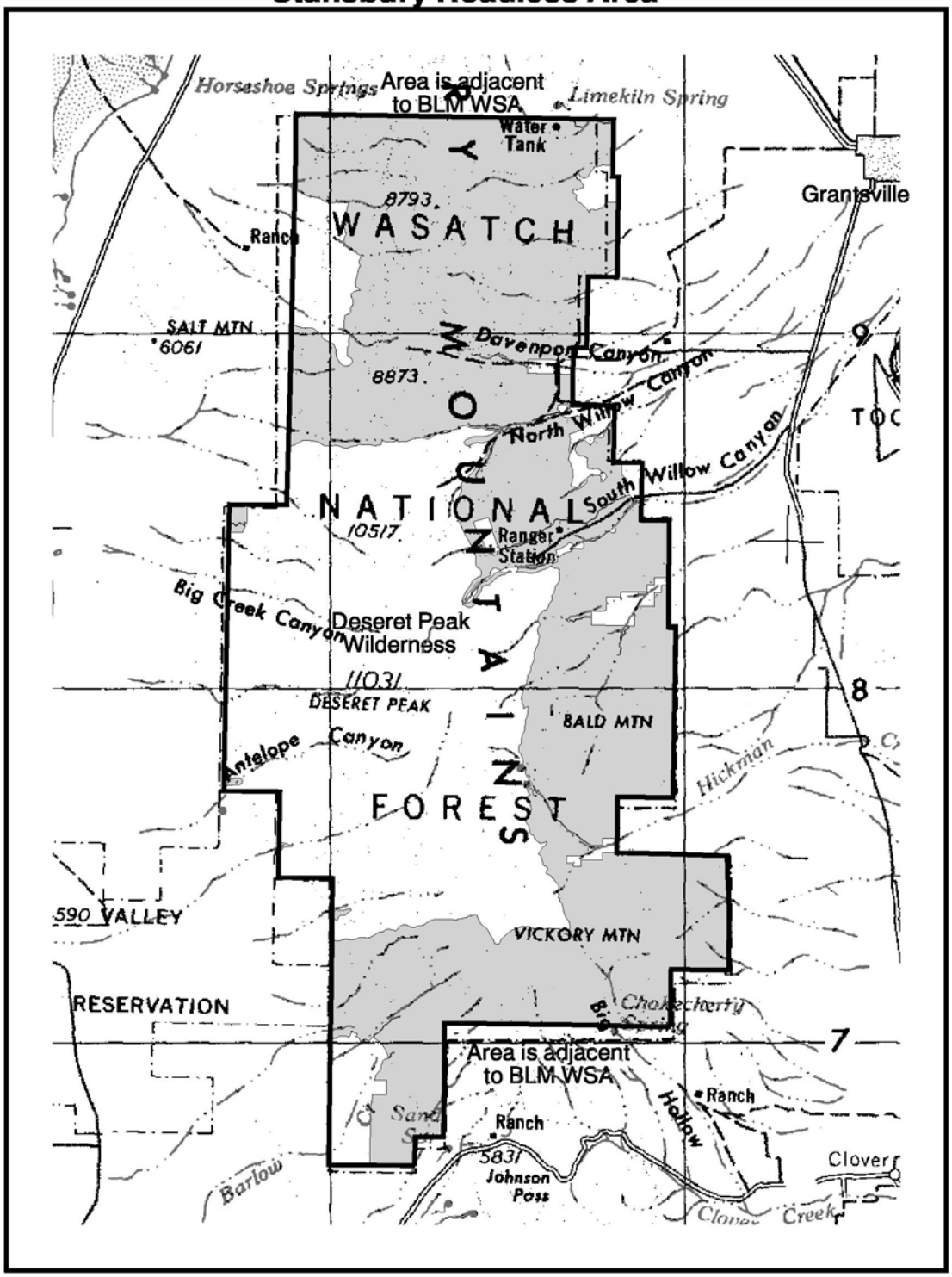
Stansbury Management Area Roadless Areas



Stansbury Management Area
Inventoried Roadless Areas
Existing Wilderness

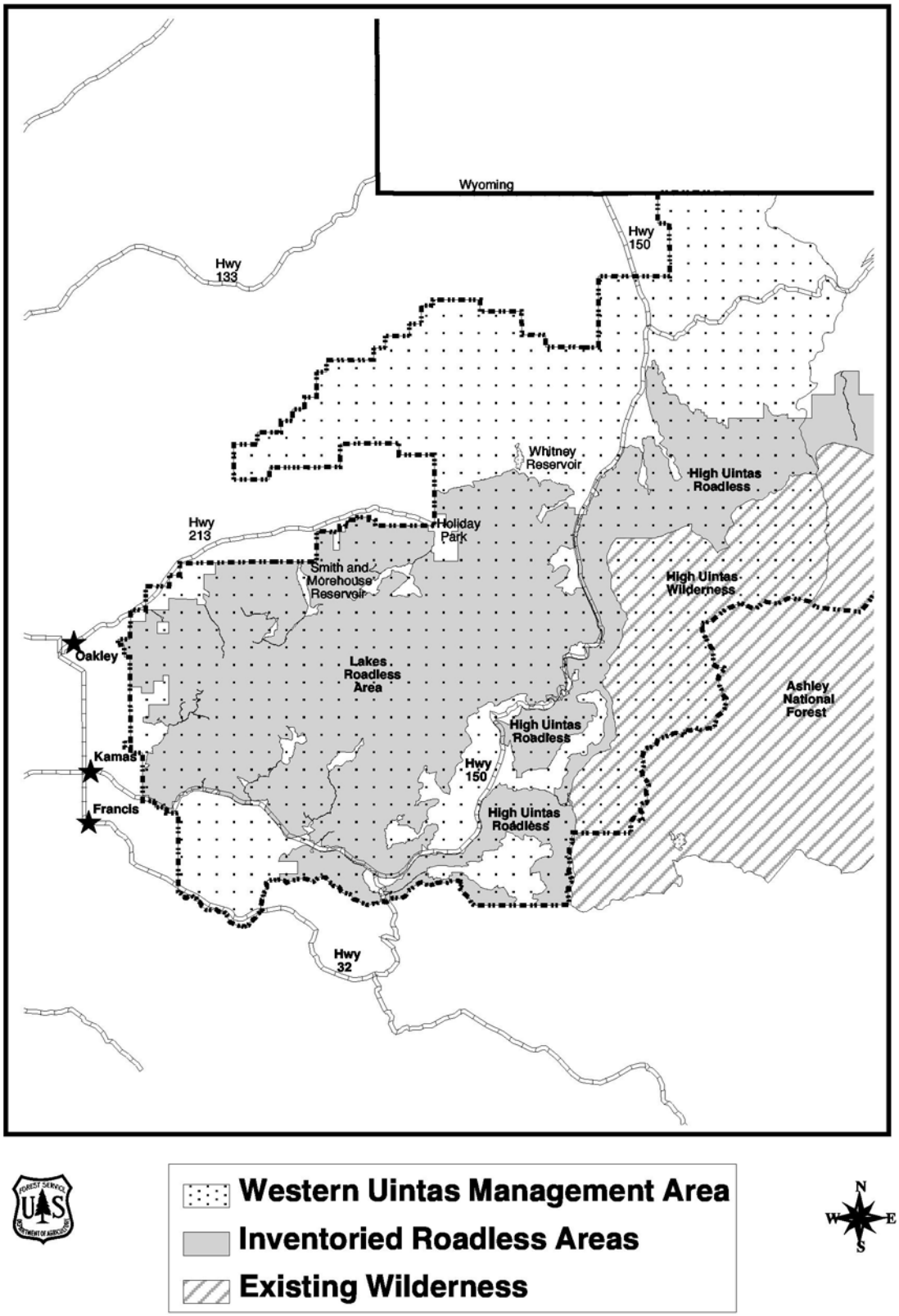
N
W
E
S

Stansbury Roadless Area

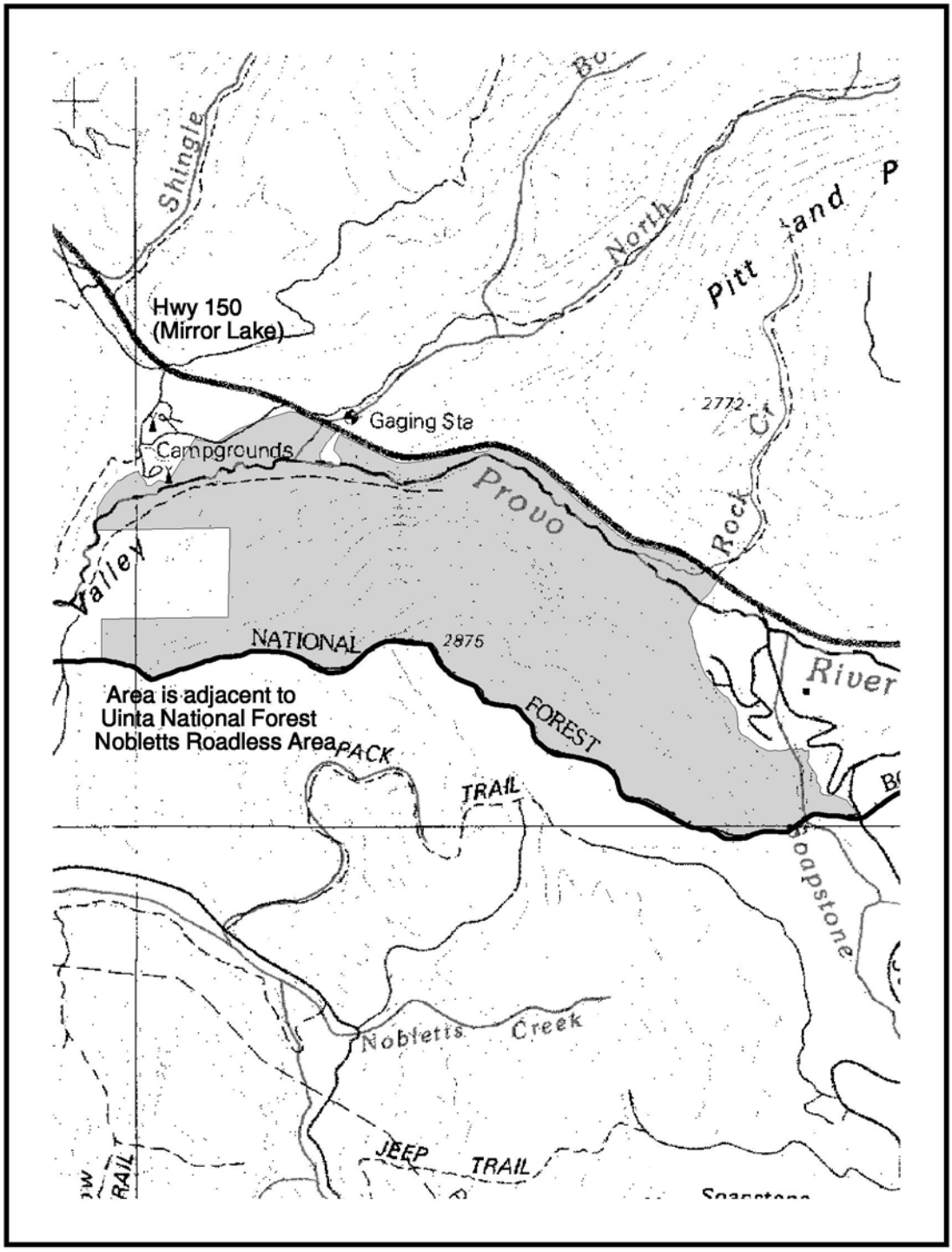


Stansbury Roadless Area
District: Salt Lake
Management Area: Stansbury
Size: 39,680 Acres

Western Uintas Management Area Roadless Areas

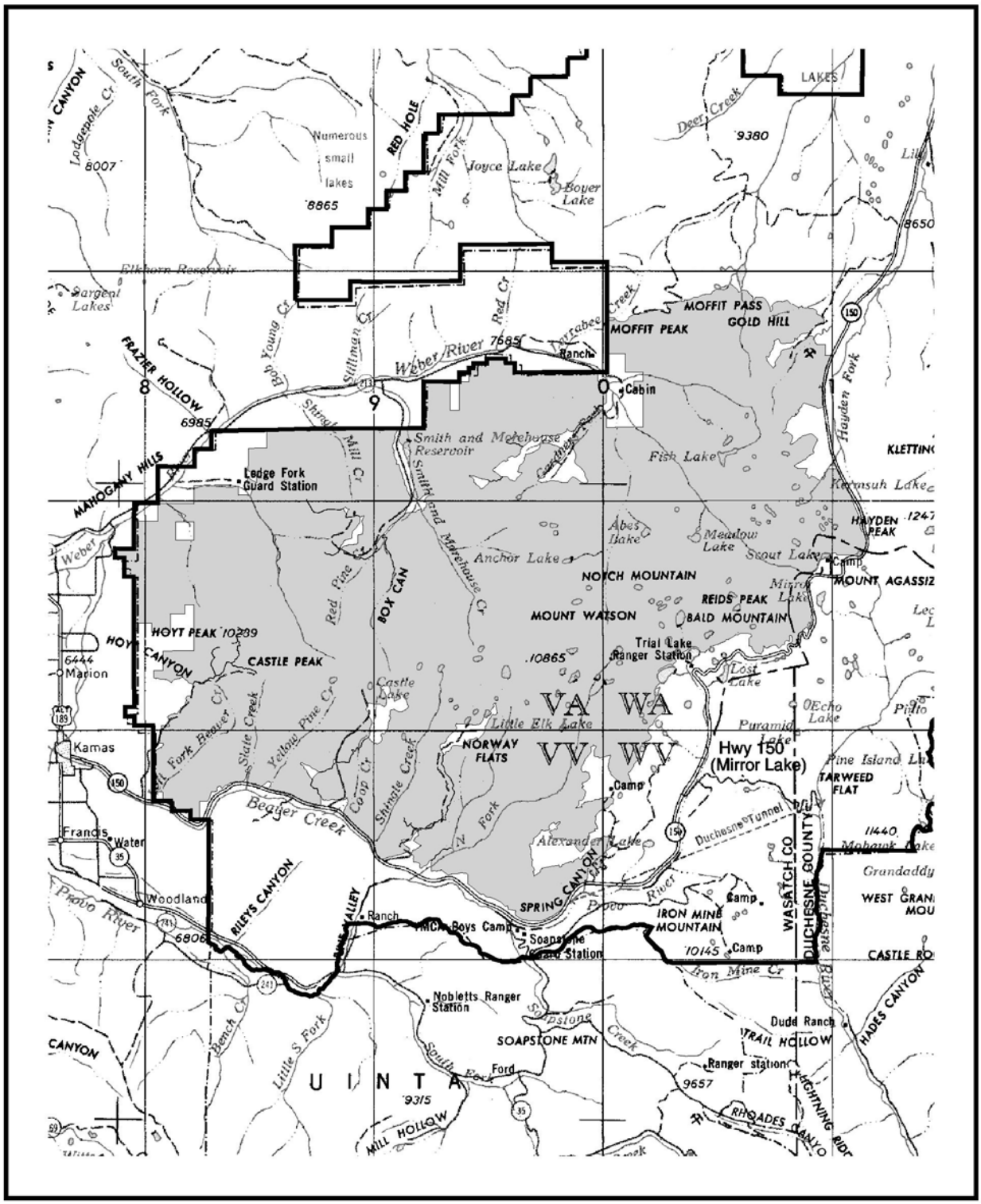


Nobletts Roadless Area



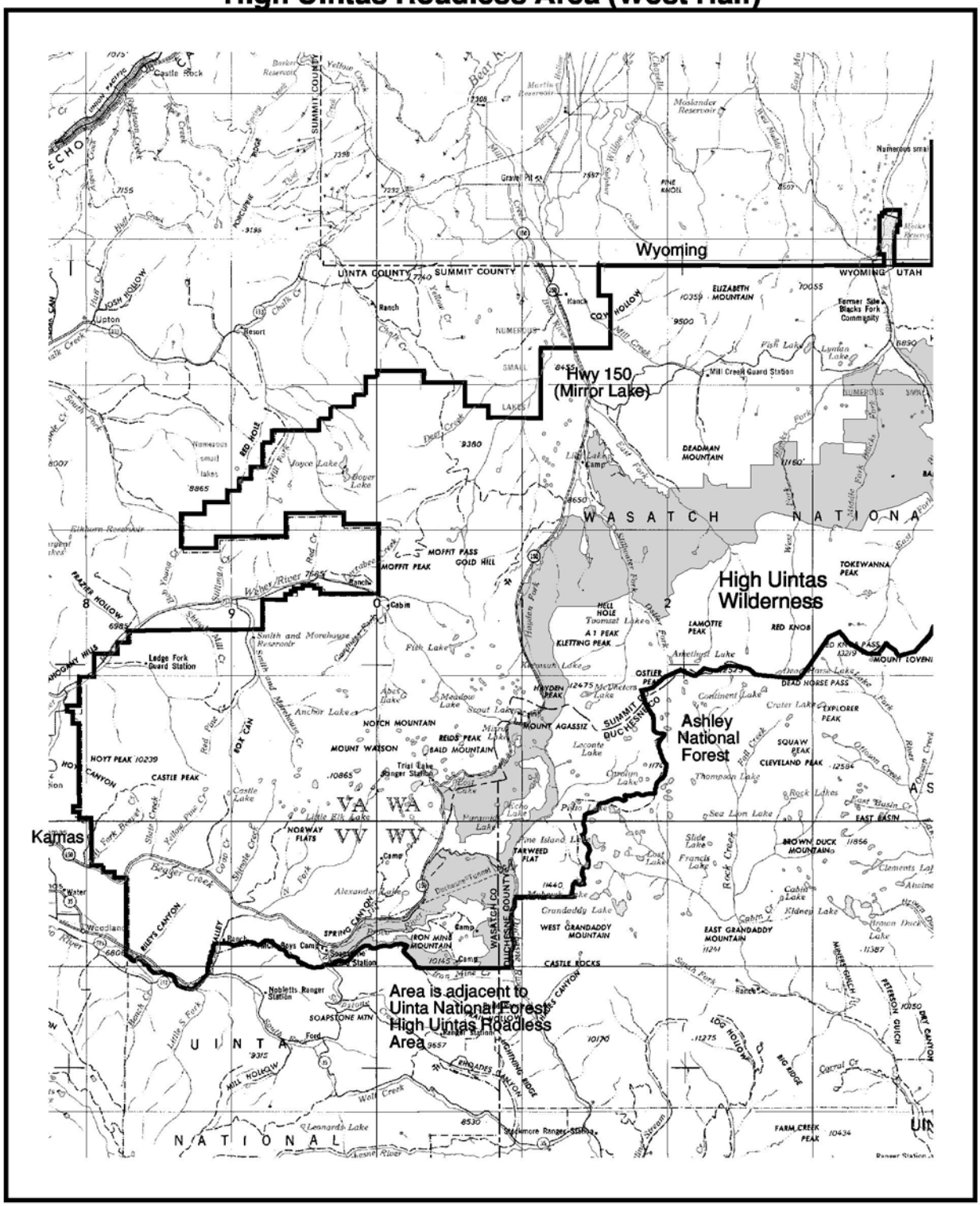
Nobletts Roadless Area
District: Kamas
Management Area: Western Uintas
Size: 3,113 Acres

Lakes Roadless Area



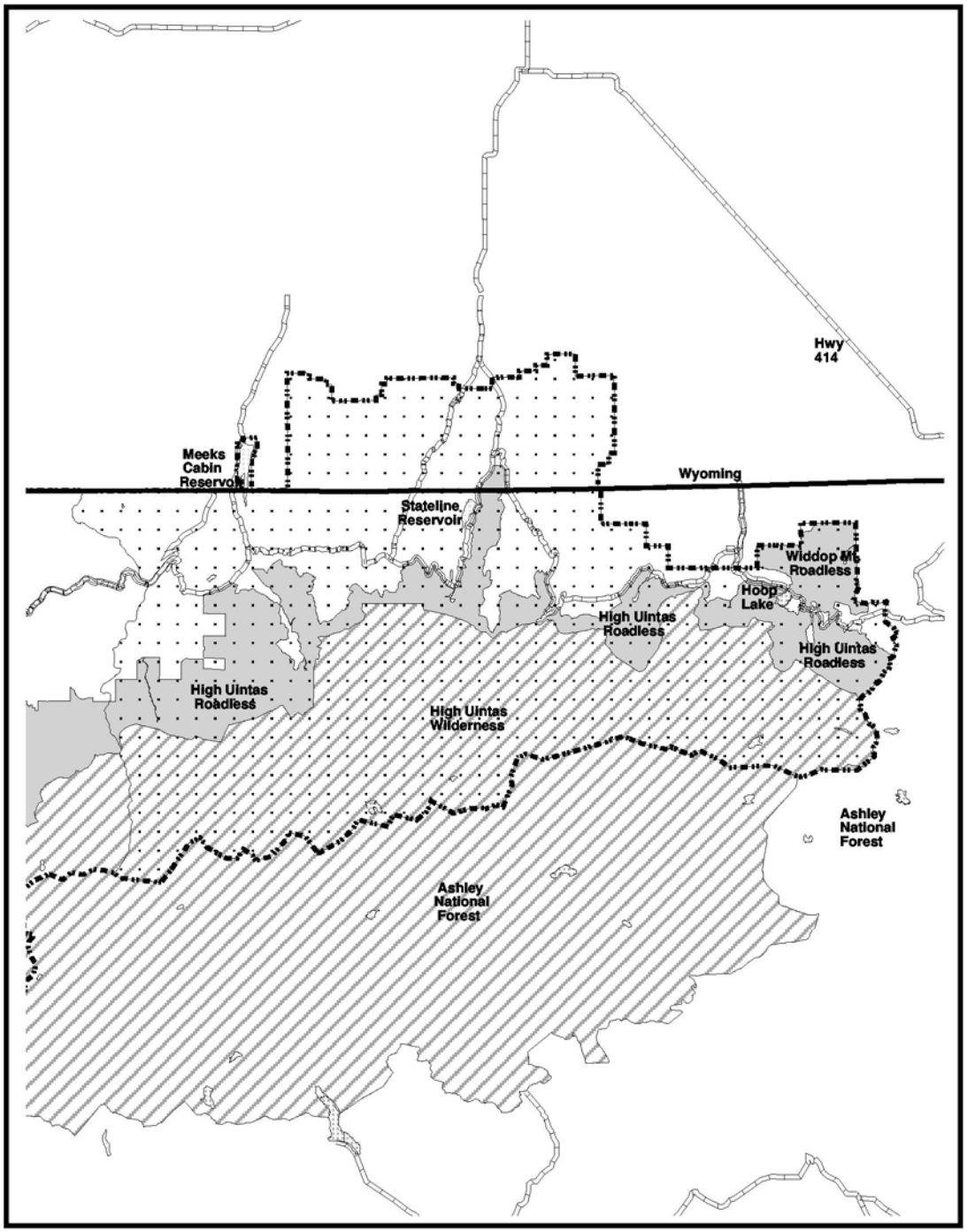
Lakes Roadless Area
District: Kamas, Evanston/Mountain View
Management Area: Western Uintas
Size: 122,019 Acres

High Uintas Roadless Area (West Half)



High Uintas Roadless Area
District: Kamas, Evanston/Mountain View
Management Area: Western and Eastern Uintas
Size: 103,071 Acres

Eastern Uintas Management Area Roadless Areas



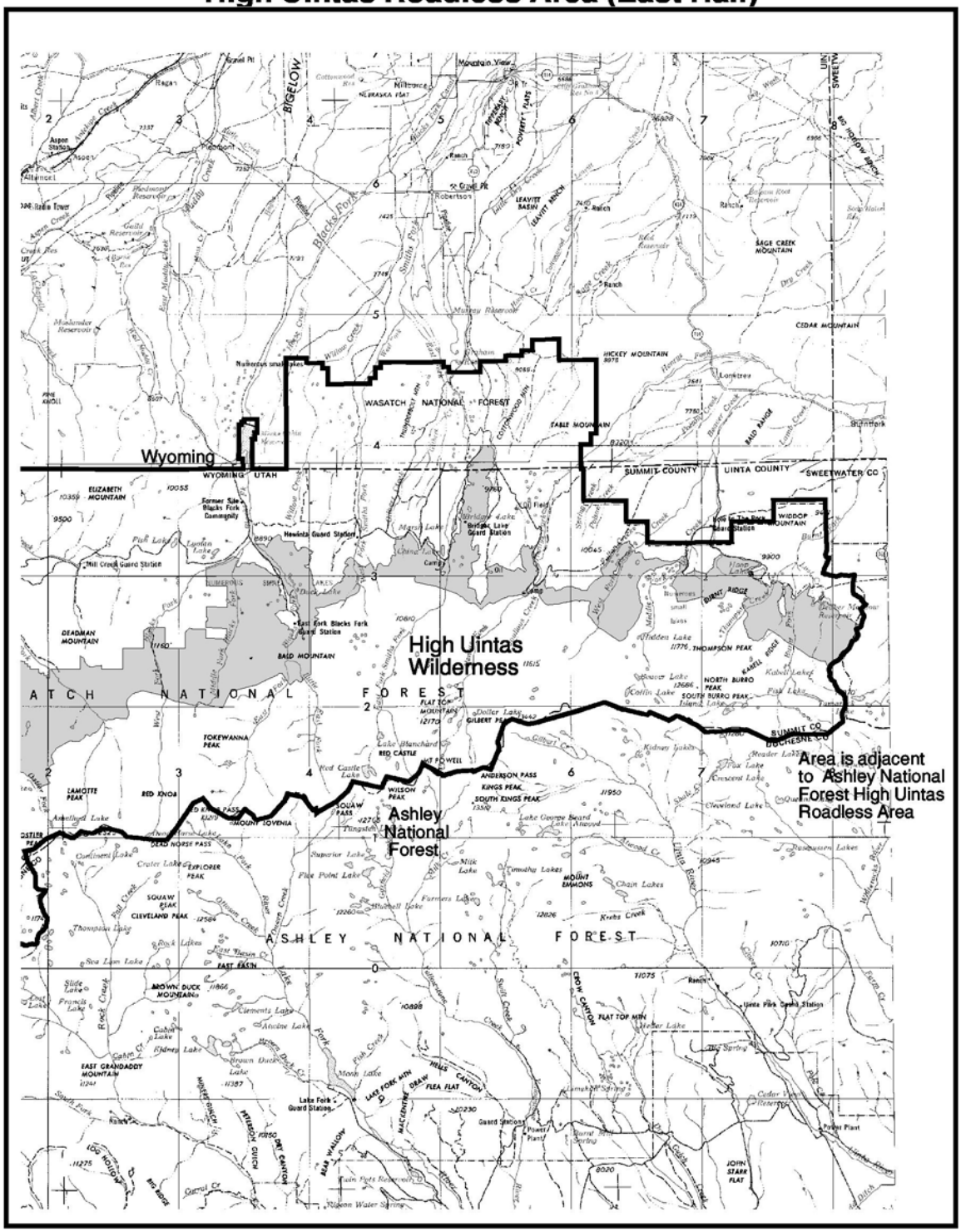
Eastern Uintas Management Area

Inventoried Roadless Areas

Existing Wilderness

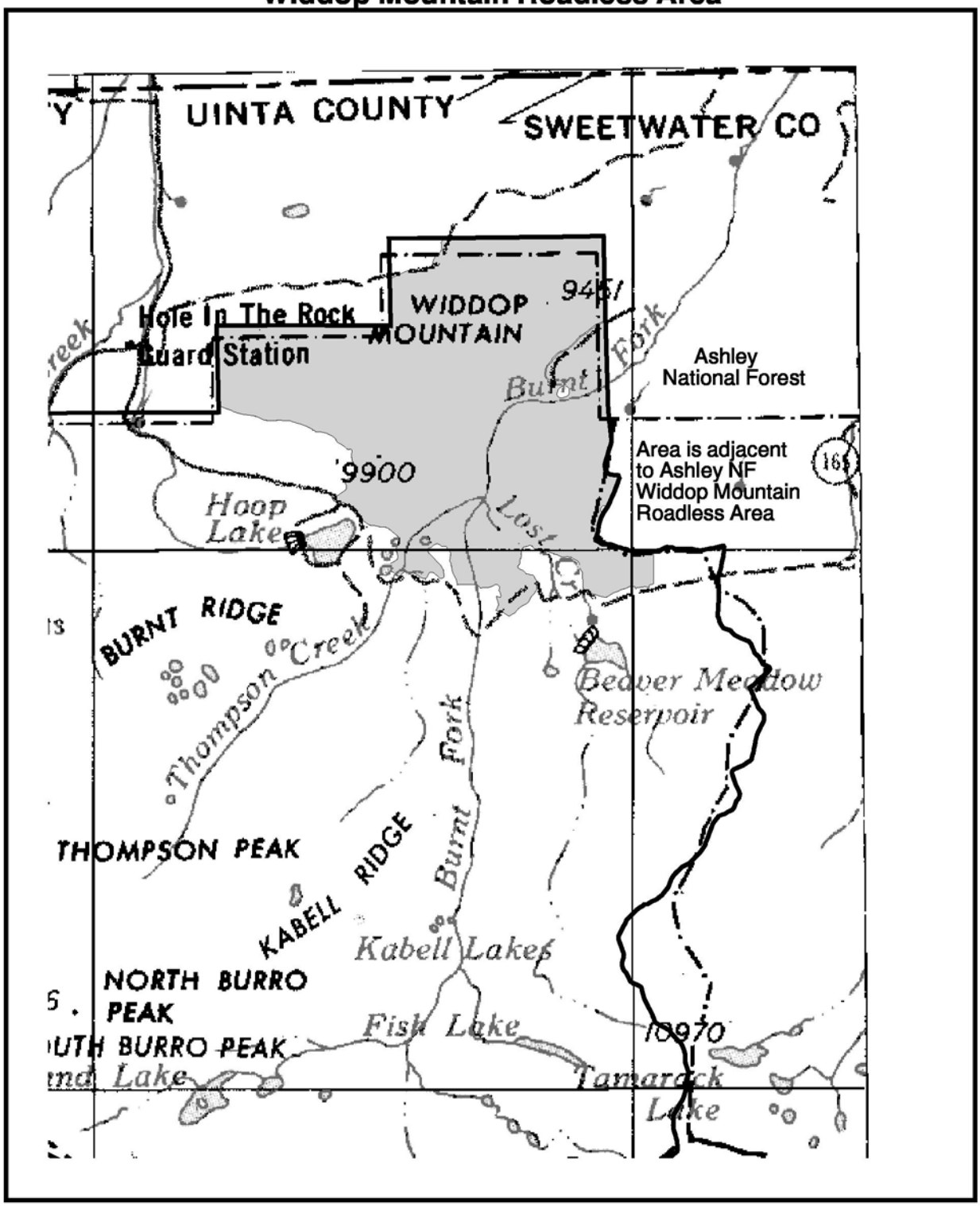
N
W
E
S

High Uintas Roadless Area (East Half)



High Uintas Roadless Area
District: Kamas, Evanston/Mountain View
Management Area: Western and Eastern Uintas
Size: 103,071 Acres

Widdop Mountain Roadless Area



Widdop Mountain Roadless Area
District: Evanston/Mountain View
Management Area: Eastern Uintas
Size: 7,997 Acres

Management Prescriptions

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7)

Existing Wilderness
- 1.1 - Opportunity Class I
- 1.2 - Opportunity Class II
- 1.3 - Opportunity Class III
- 1.5 - Proposed Wilderness

Special Management Area
- 2.4 - Research Natural Areas
- 2.5 - Scenic Byways
- 2.6 - Undeveloped Areas
- 2.7 - Special Interest Areas

Protection, Maintenance or Restoration of Biophysical Resources
- 3.1a - Aquatic Habitat Emphasis
- 3.1w - Watershed Emphasis
- 3.2d - Terrestrial Habitat Emphasis - Developed
- 3.2u - Terrestrial Habitat Emphasis - Undeveloped

Multiple Resource Use, Recreation Emphasized
- 4.1 - Backcountry Non-Motorized Emphasis
- 4.2 - Dispersed Non-Motorized Emphasis
- 4.3 - Backcountry Motorized Emphasis
- 4.4 - Dispersed Motorized Emphasis
- 4.5 - Developed Recreation Areas Emphasis

Multiple Resource Use, Forested Vegetation Management Emphasized
- 5.1 - Maintaining/Restoring Forested Ecosystem Integrity
- 5.2 - Timber Growth & Yield Emphasized

Multiple Resource Use, Rangeland Vegetation Management Emphasized
- 6.1 - Maintaining/Restoring Non-Forested Ecosystem Integrity
- 6.2 - Livestock Forage Production Emphasis

Concentrated Development Areas
- 8.1 - Mineral Development Emphasis

- 2002 Roadless Inventory with Road Cherry-stems
- State & Department of Defense Lands
- Private Lands
- Management Areas

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6236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3600

1 0 1 2 3 Miles
Scale 1:126,720

Cache - Box Elder Management Area

Bear Management Area

Stansbury Management Area

North Wasatch / Ogden Valley Management Area

Central Wasatch Management Area

Tri-canyon area
Enlarged to show detail
Scale 1:63,360
500' contour interval

Wasatch-Cache National Forest
UTAH
General Area

February 2003

Management Prescriptions

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7)

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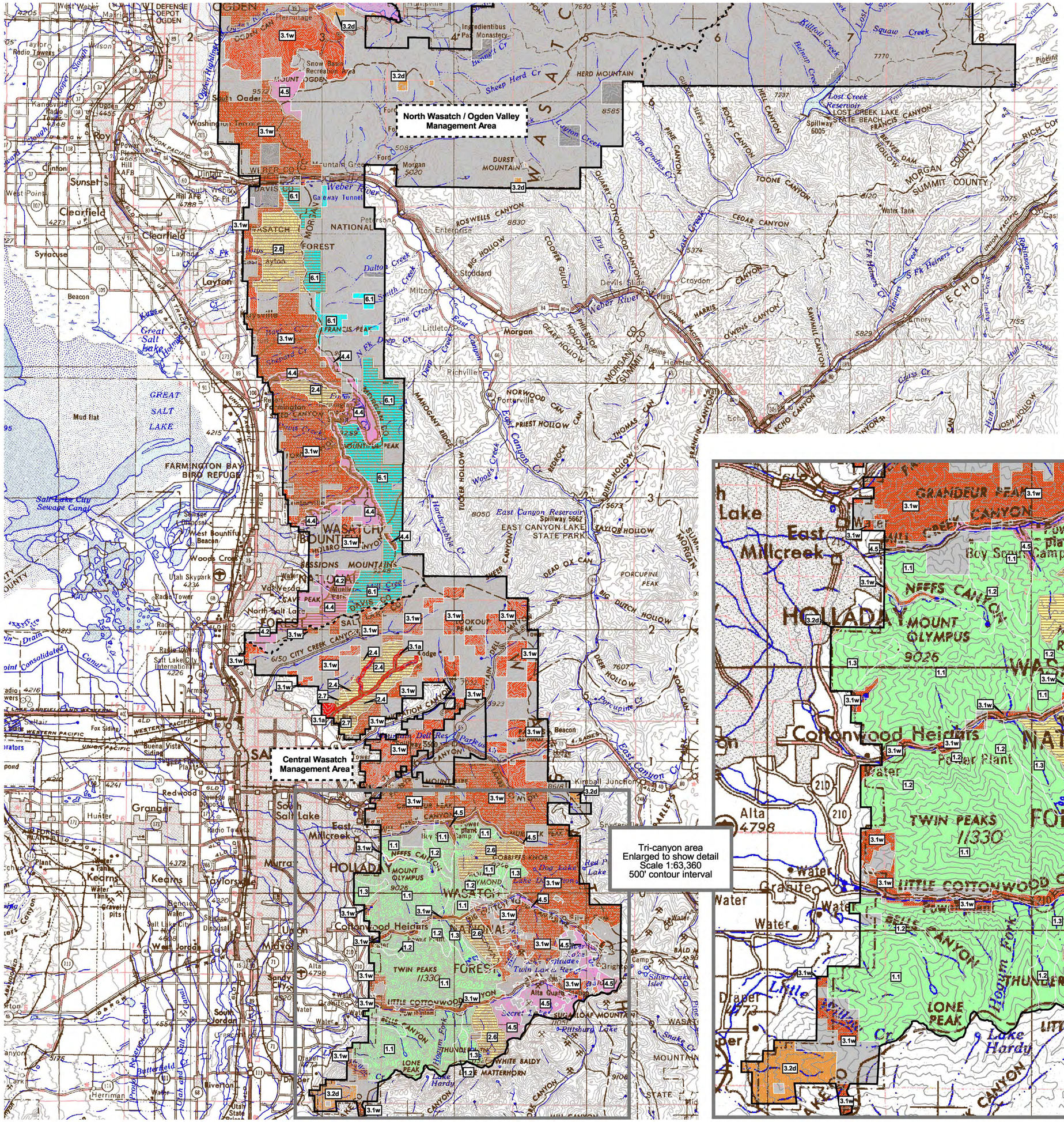
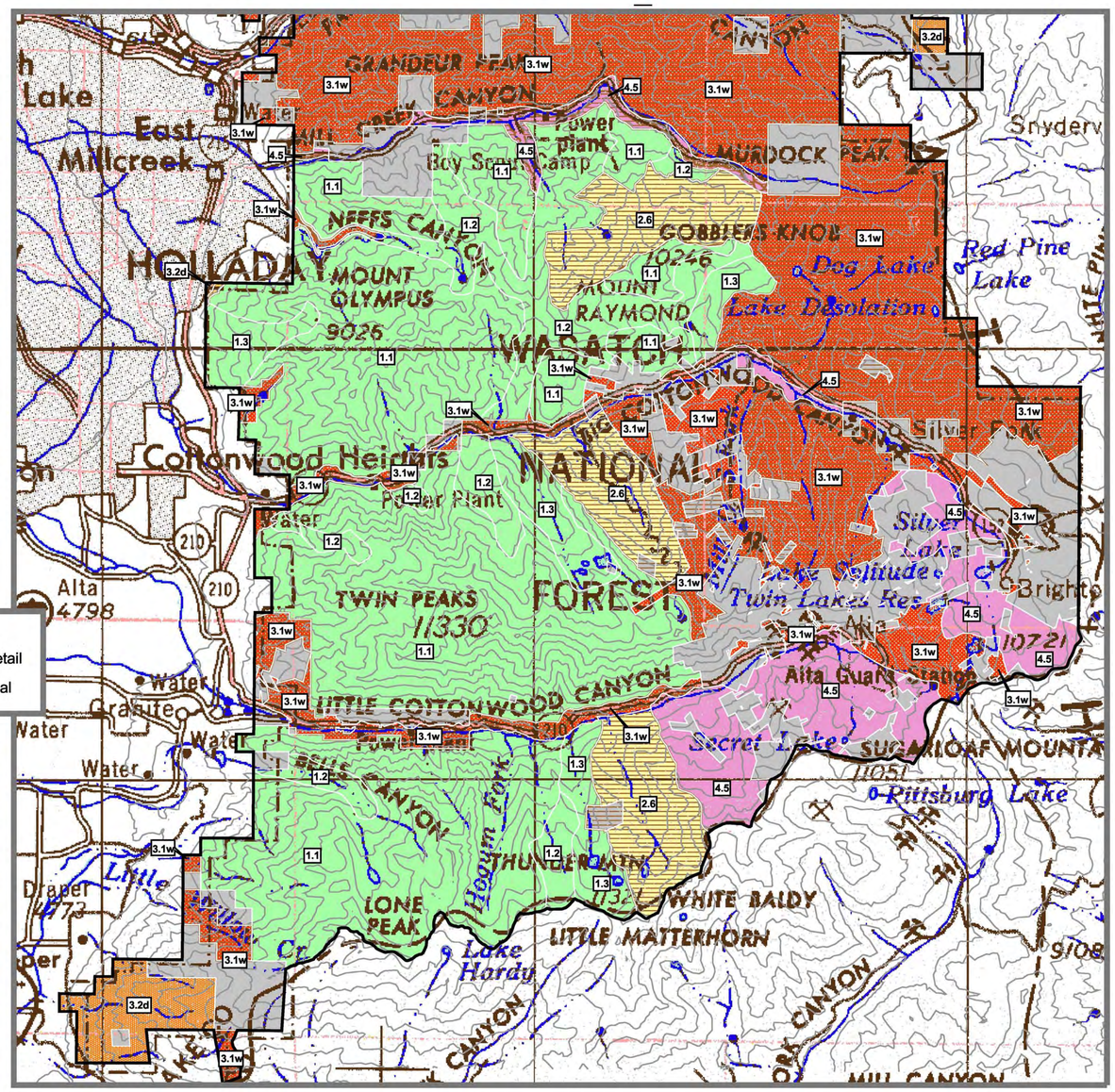
5296 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3900

1 0 1 2 3 Miles
Scale 1:126,720





February 2003

Management Prescriptions

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7)

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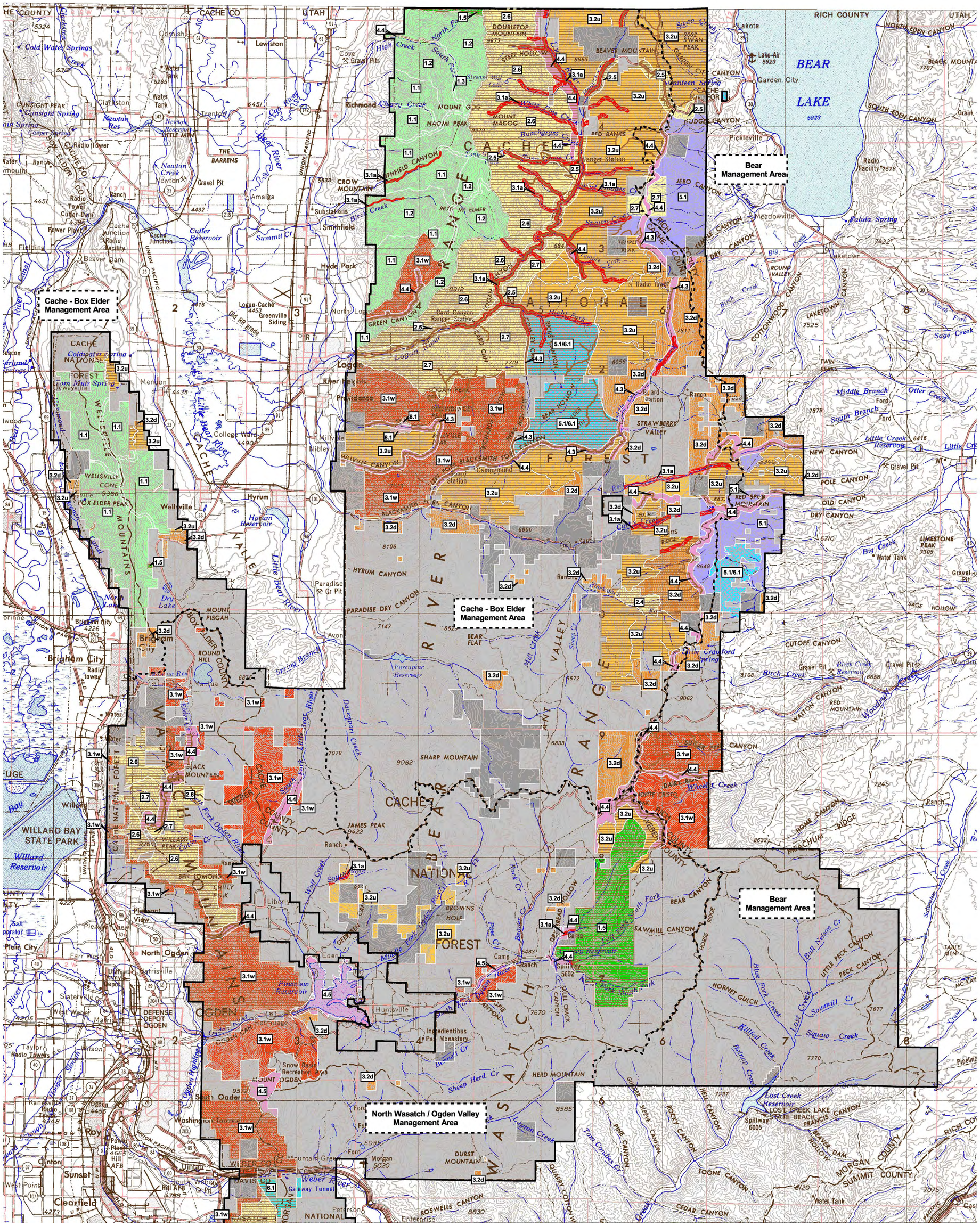
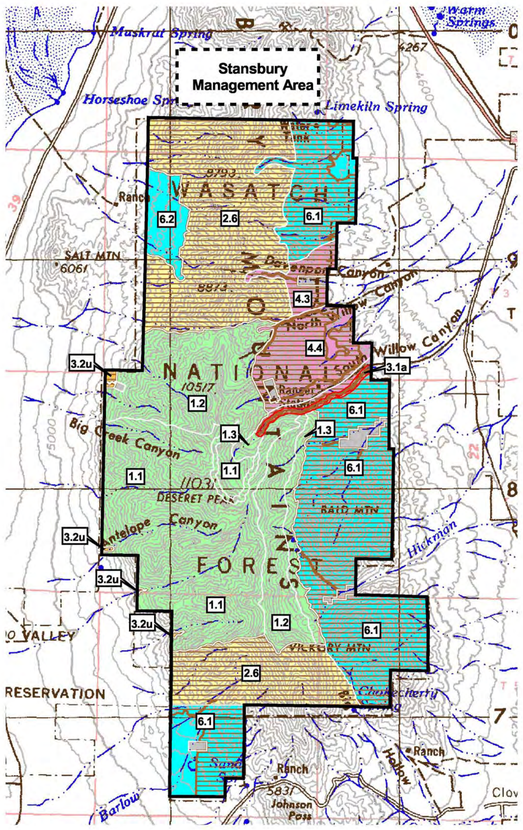
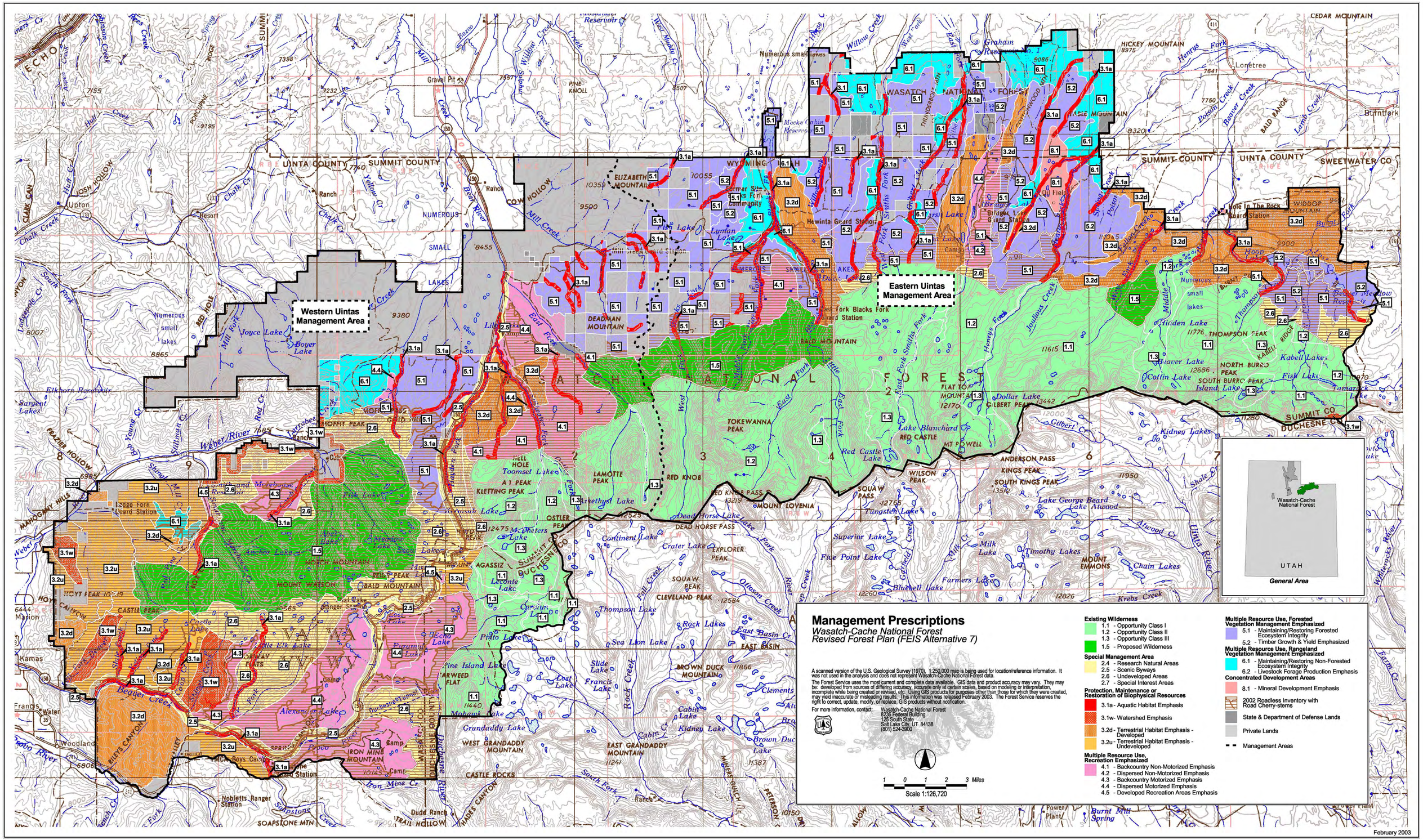
1 0 1 2 3 Miles
Scale 1:126,720







February 2003

Recreation Opportunity Spectrum

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7, Appendix B - 6)

- Urban
- Rural
- Roaded Natural
- Semi-Primitive Motorized
- Semi-Primitive Non-Motorized
- Wilderness / Semi-Primitive Non-Motorized
- Wilderness / Primitive Non-Motorized
- Roads
- Motorized Trails
- Trails
- Management Areas
- State & Department of Defense Lands
- Private Lands

NOTE: This is NOT a Travel Management Map. See District Travel Management Maps for routes designated open to motorized uses.

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1 0 1 2 3 Miles
Scale 1:126,720

Bear Management Area

Cache - Box Elder Management Area

Cache - Box Elder Management Area

Bear Management Area

North Wasatch / Ogden Valley Management Area

Central Wasatch Management Area

Stansbury Management Area

Wasatch-Cache National Forest

UTAH

General Area

Tri-canyon area
Enlarged to show detail
Scale 1:63,360
500' contour interval

February 2003

Recreation Opportunity Spectrum

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7, Appendix B - 6)

- Urban
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- State & Department of Defense Lands
- Private Lands

NOTE: This is NOT a Travel Management Map. See District Travel Management Maps for routes designated open to motorized uses.

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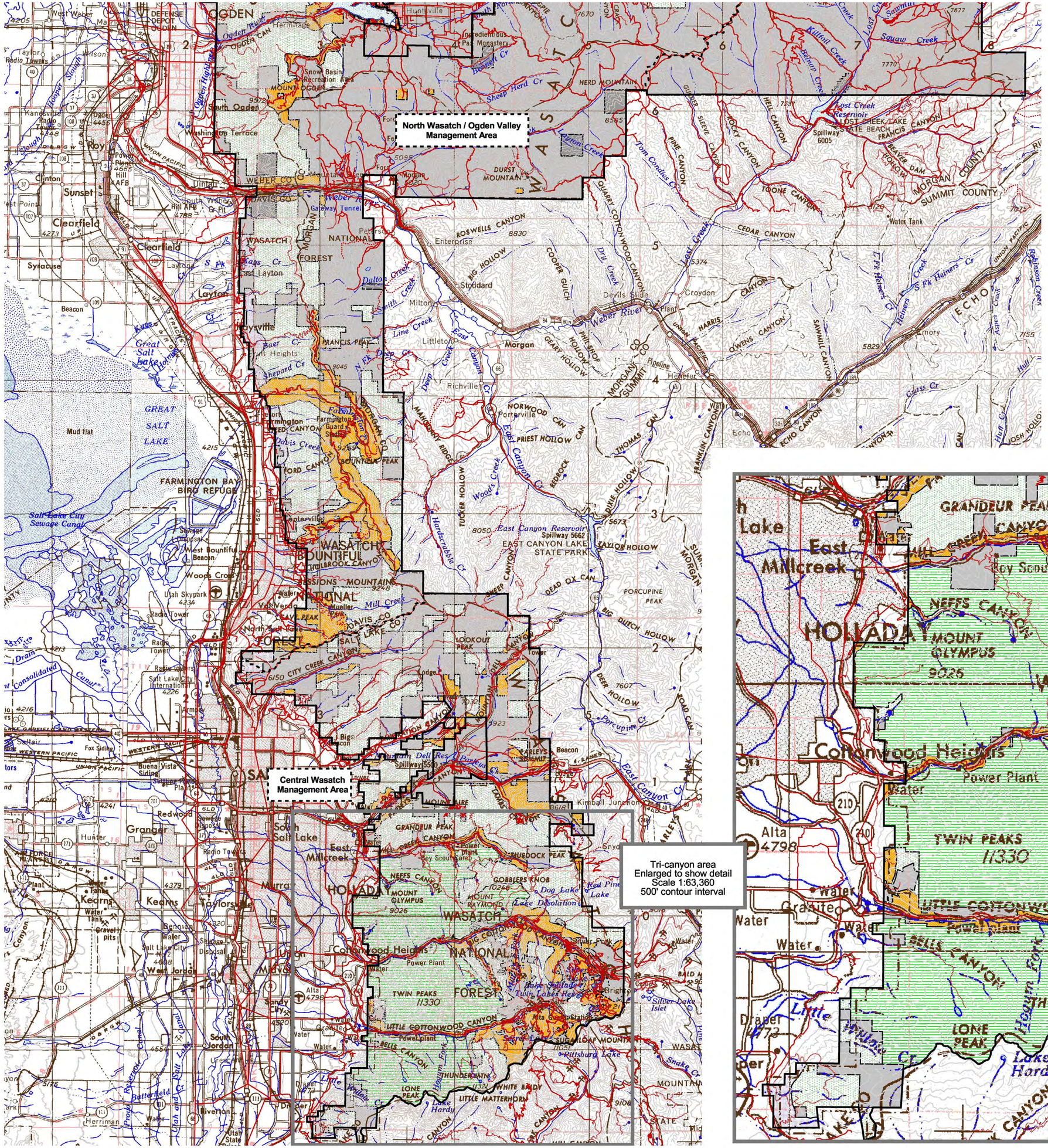
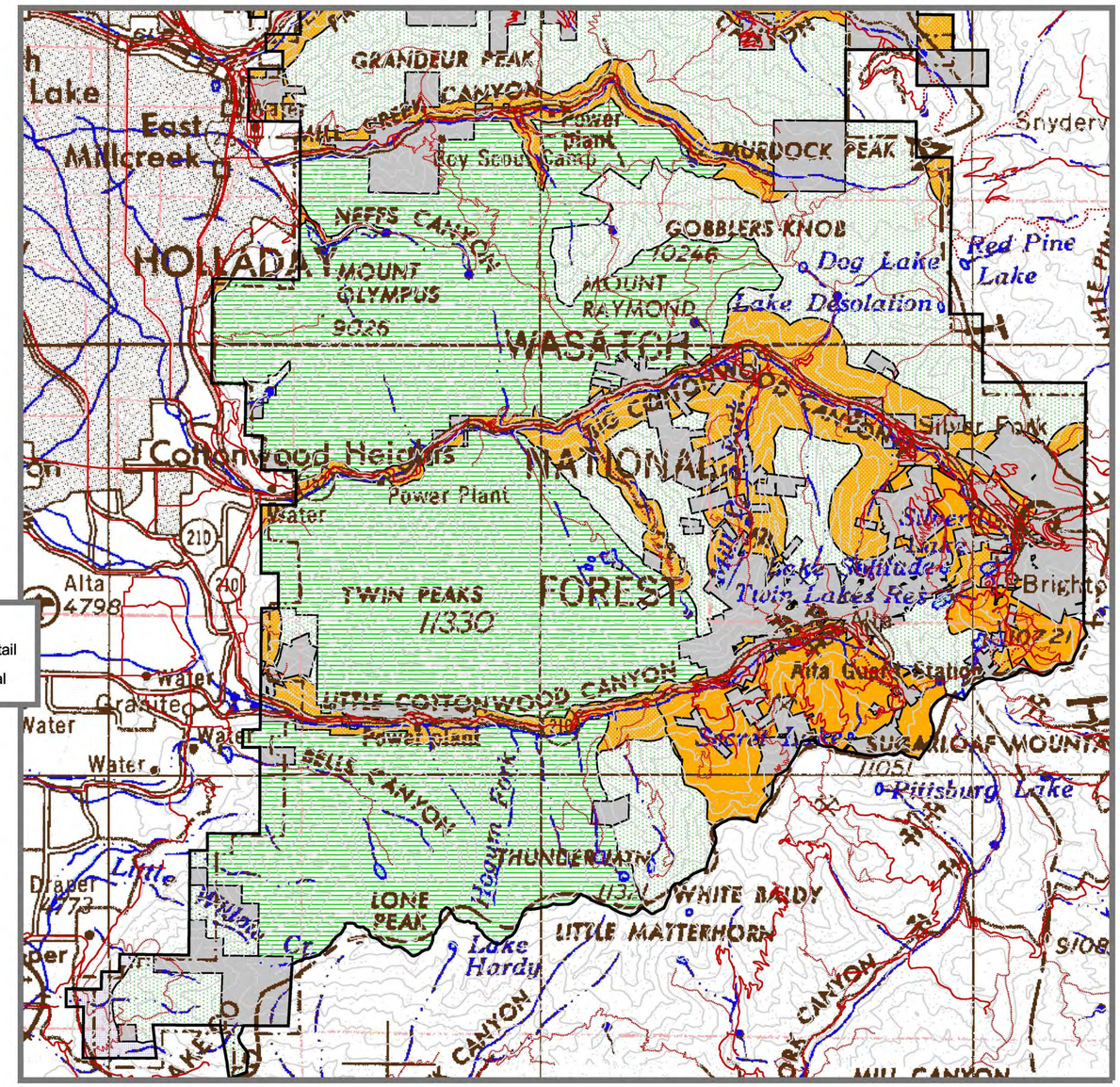
For more information, contact:
Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3900

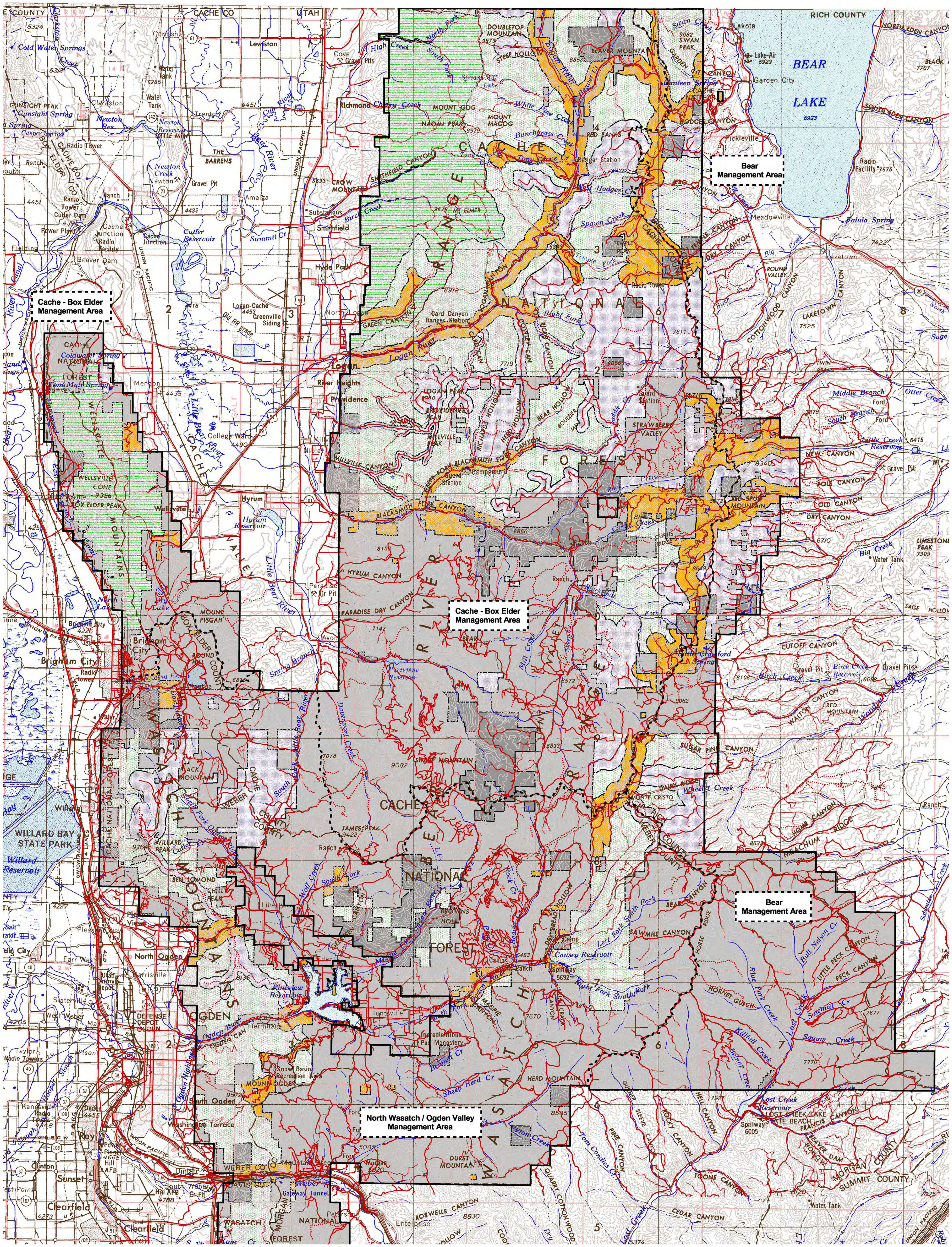
1 0 1 2 3 Miles

Scale 1:126,720





February 2003



Recreation Opportunity Spectrum

Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7, Appendix B - 6)

🟥	Urban	∧∨	Roads
🟧	Rural	∴	Motorized Trails
▨	Roaded Natural	∴	Trails
▨	Semi-Primitive Motorized	⋰	Management Areas
▨	Semi-Primitive Non-Motorized	■	State & Department of Defense Lands
▤	Wilderness / Semi-Primitive Non-Motorized	▨	Private Lands
▨	Wilderness / Primitive Non-Motorized		

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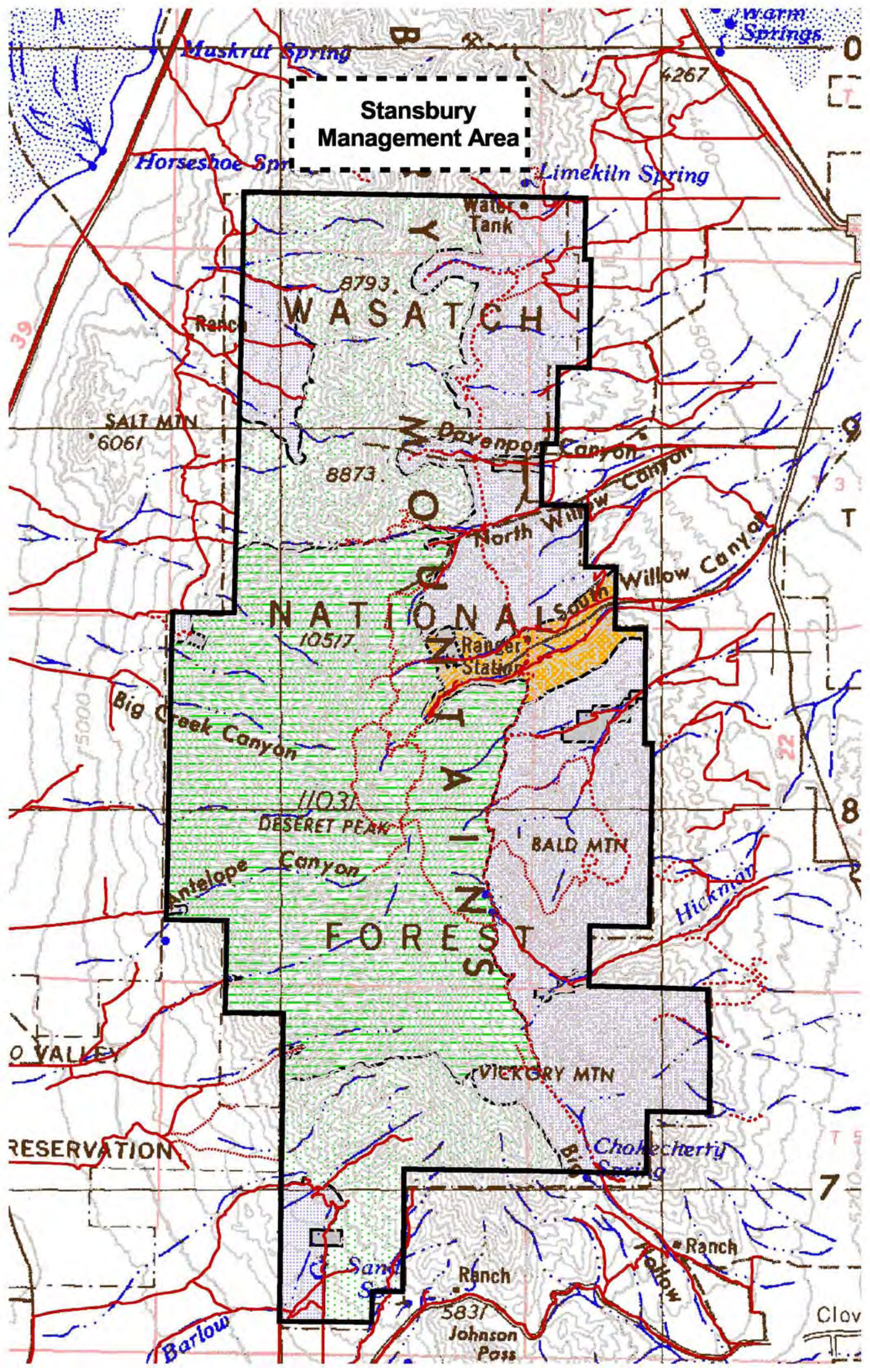
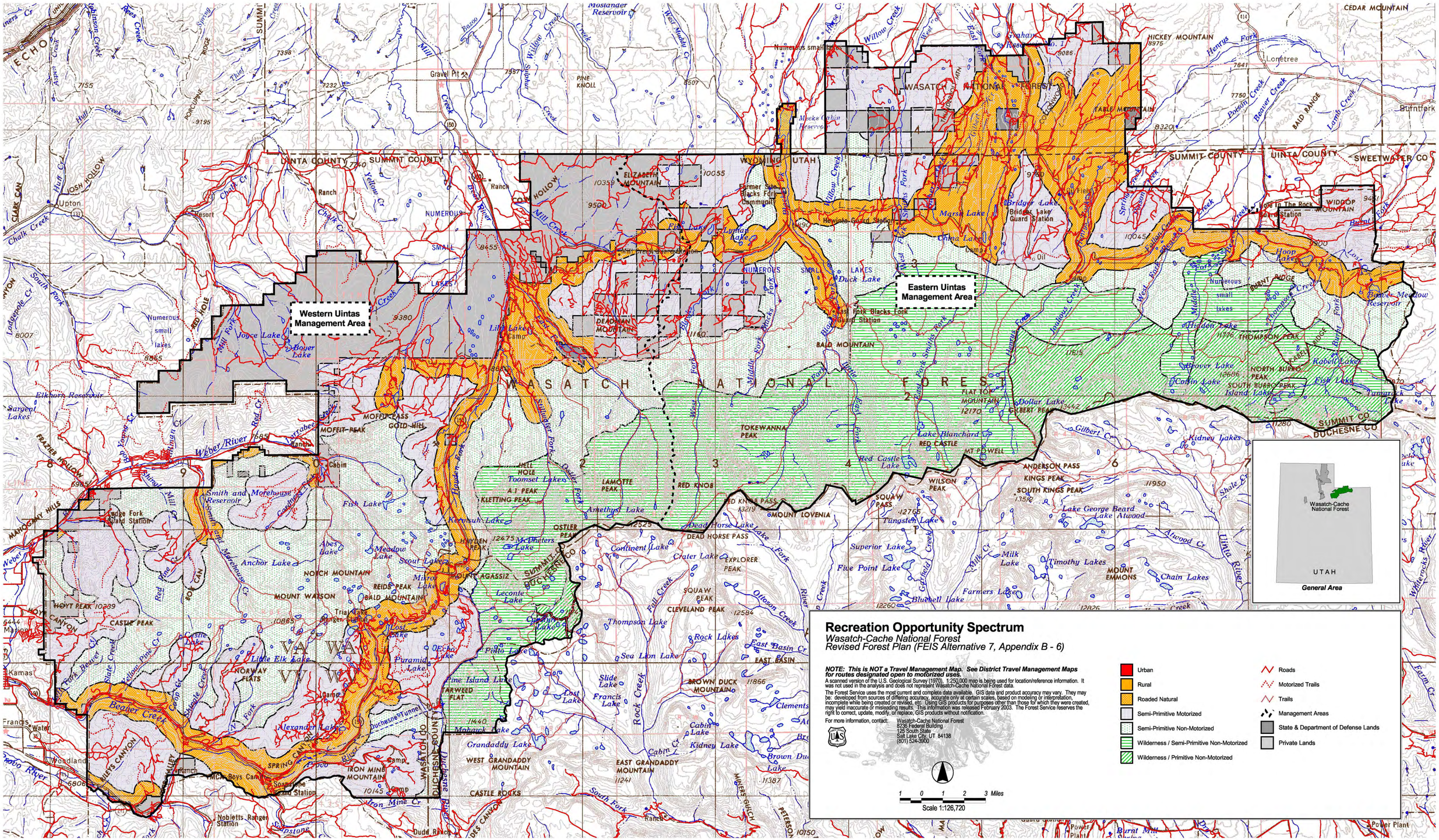
Scale 1:126,720



General Area


Recreation Opportunity Spectrum
Wasatch-Cache National Forest
Revised Forest Plan (FEIS Alternative 7, Appendix B - 6)
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(801) 524-3900
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Roads
Motorized Trails
Trails
Management Areas
State & Department of Defense Lands
Private Lands
1 0 1 2 3 Miles
Scale 1:126,720
Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SUMMIT CO
DUCHESNE CO
SWEETWATER CO
Wasatch-Cache National Forest
UTAH
General Area
February 2003

Winter Recreation

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Alternative 7)

- Motorized
- Non-Motorized
- Wilderness - Non-Motorized
- Big Game Winter Range
- Ski Resort
- Heli-Skiing
- State & Department of Defense Lands
- Private Lands
- Groomed Snowmobile Route
- Motorized Access Route
- Roads (roads are shown for reference only and are not open to winter motorized use unless otherwise indicated)
- Management Areas

The Winter Recreation Map allocation applies when there is an adequate depth of snow to protect vegetation. When there is not adequate snow, summer ROS Maps and descriptions as well as Travel Management Plans apply and use of snowmobiles is not allowed off designated routes.

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1 0 1 2 3 Miles
Scale 1:126,720

Cache - Box Elder Management Area

Bear Management Area

Stansbury Management Area

Wasatch-Cache National Forest
UTAH
General Area

Central Wasatch Management Area

North Wasatch / Ogden Valley Management Area

Tri-canyon area
Enlarged to show detail
Scale 1:63,360
500' contour interval

February 2003

Winter Recreation

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Alternative 7)

- Motorized
- Non-Motorized
- Wilderness - Non-Motorized
- Big Game Winter Range
- Ski Resort
- Heli-Skiing
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1 0 1 2 3 Miles
Scale 1:126,720

North Wasatch / Ogden Valley Management Area

Central Wasatch Management Area

Tri-canyon area
Enlarged to show detail
Scale 1:63,360
500' contour interval

February 2003

Winter Recreation

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Alternative 7)

- Motorized
- Non-Motorized
- Wilderness - Non-Motorized
- Big Game Winter Range
- Ski Resort
- Heli-Skiing
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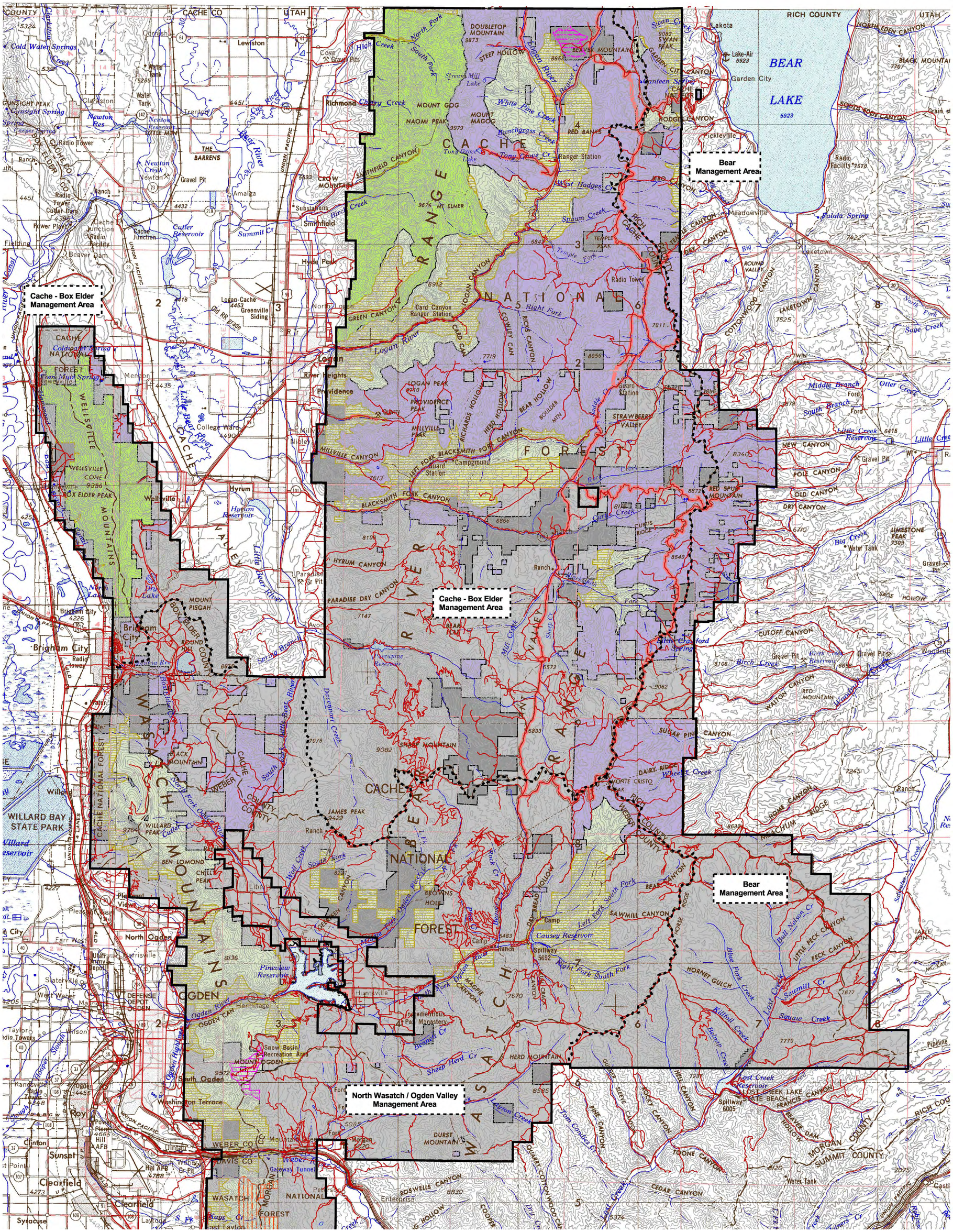
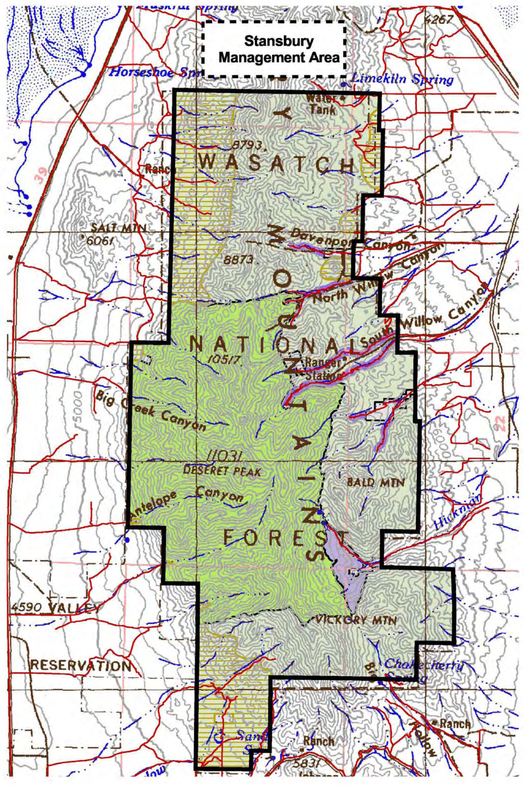
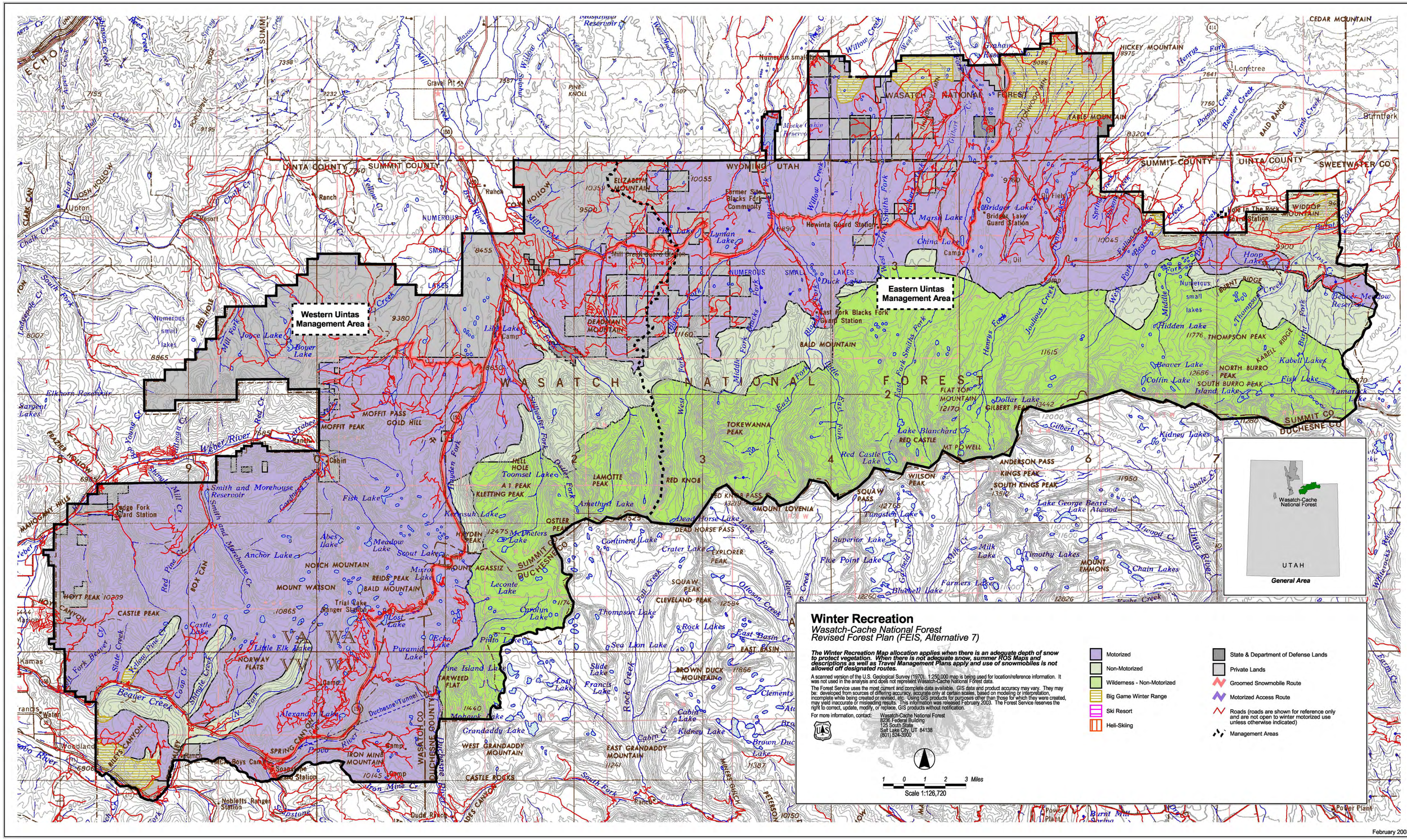
1 0 1 2 3 Miles

Scale 1:126,720

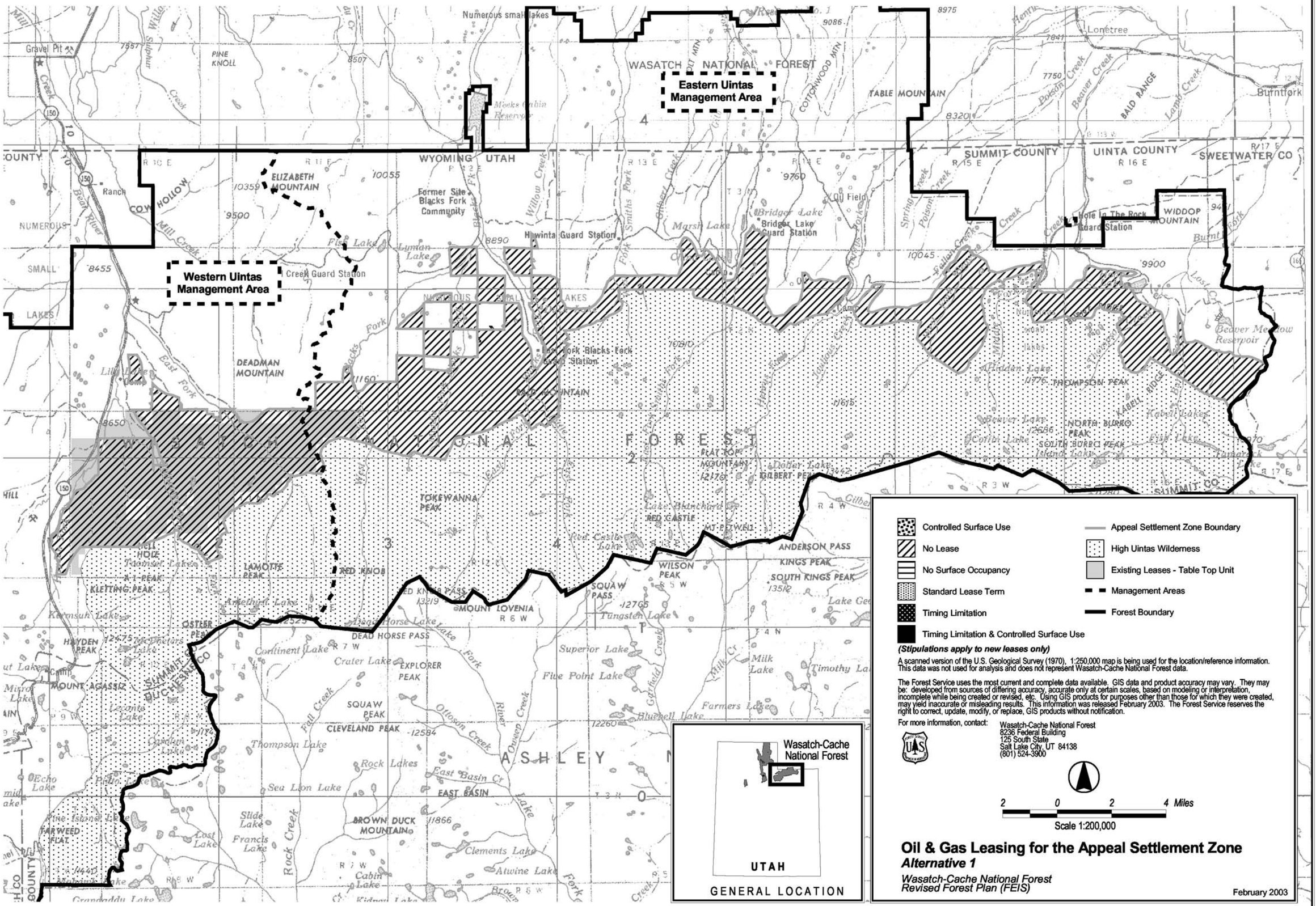




General Area



February 2003


Eastern Uintas Management Area
Western Uintas Management Area
WASATCH NATIONAL FOREST
WYOMING
UTAH
SUMMIT COUNTY
UINTA COUNTY
SWEETWATER CO
ELIZABETH MOUNTAIN
DEADMAN MOUNTAIN
TABLE MOUNTAIN
BALD RANGE
WIDDOP MOUNTAIN
Hole In The Rock Guard Station
Bridger Lake Guard Station
Haywinta Guard Station
Creek Guard Station
Former Site Blacks Fork Community
Numerous small lakes
Gravel Pit
Lonetree
Burntfork
Beaver Meadow Reservoir
Meeks Cabin Reservoir
TOKEWANNA PEAK
RED CASTLE
MT POWELL
ANDERSON PASS
KINGS PEAK
SOUTH KINGS PEAK
WILSON PEAK
SQUAW PASS
MOUNT LOVENIA
DEAD HORSE PASS
RED KNOB
LAMOTTE PEAK
KLETTING PEAK
HAYDEN PEAK
MOUNT AGASSIZ
EXPLORER PEAK
SQUAW PEAK
CLEVELAND PEAK
ASHLEY
EAST BASIN
BROWN DUCK MOUNTAIN
FARWEED FLAT
THOMPSON PEAK
NORTH BURRO PEAK
SOUTH BURRO PEAK
FLAT TOP MOUNTAIN
GILBERT PEAK
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Controlled Surface Use
No Lease
No Surface Occupancy
Standard Lease Term
Timing Limitation
Timing Limitation & Controlled Surface Use
Appeal Settlement Zone Boundary
High Uintas Wilderness
Existing Leases - Table Top Unit
Management Areas
Forest Boundary
(Stipulations apply to new leases only)
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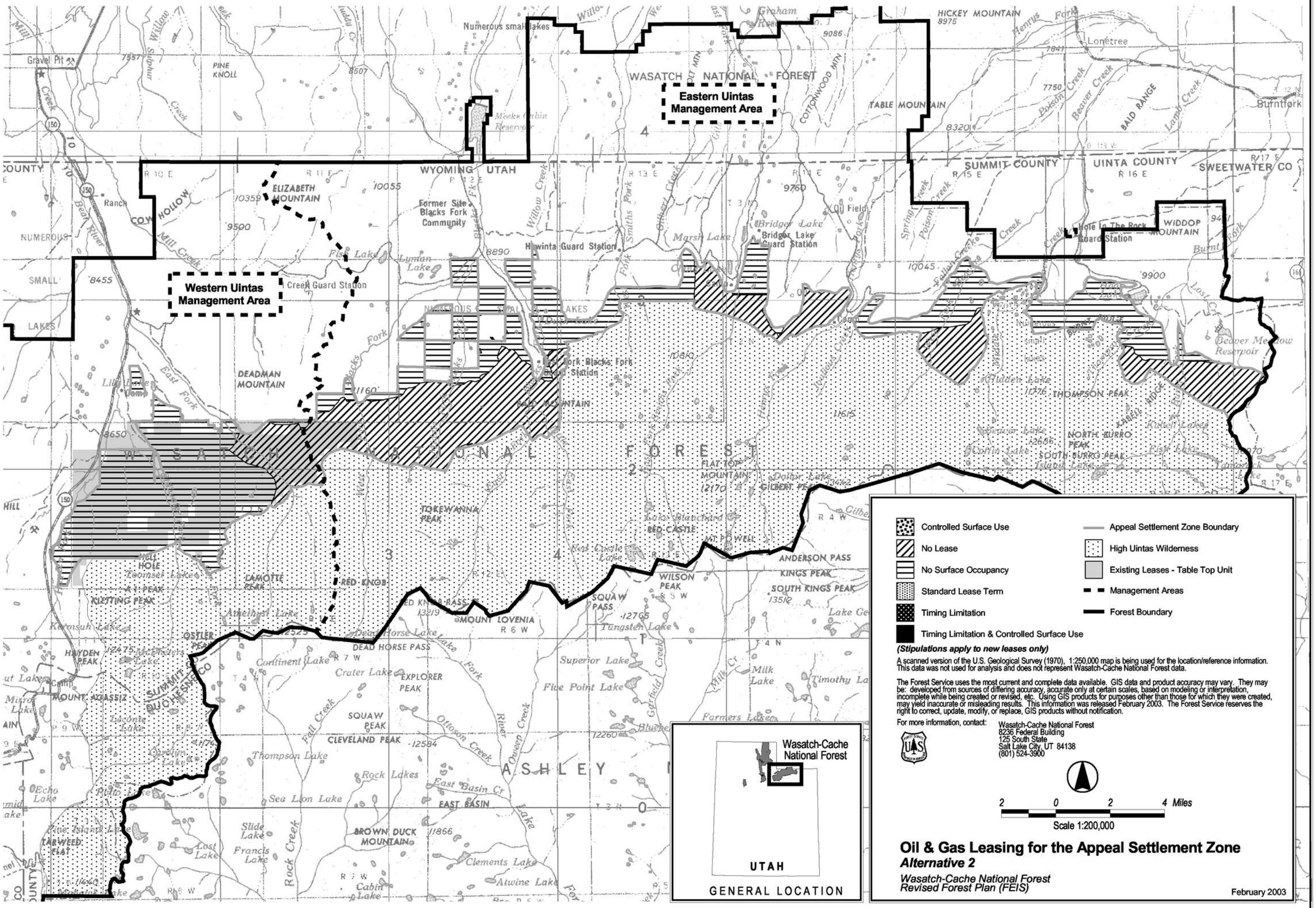
2 0 2 4 Miles
Scale 1:200,000
Oil & Gas Leasing for the Appeal Settlement Zone
Alternative 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Eastern Uintas Management Area
Western Uintas Management Area
WASATCH NATIONAL FOREST
WYOMING
UTAH
SUMMIT COUNTY
UINTA COUNTY
SWEETWATER CO
ELIZABETH MOUNTAIN
DEADMAN MOUNTAIN
TABLE MOUNTAIN
HICKEY MOUNTAIN
BALD RANGE
WIDDOP MOUNTAIN
THOMPSON PEAK
NORTH BURRO PEAK
SOUTH BURRO PEAK
FLAT TOP MOUNTAIN
GILBERT PEAK
TOKEWANNA PEAK
RED CASTLE
ANDERSON PASS
KINGS PEAK
SOUTH KINGS PEAK
WILSON PEAK
SQUAW PASS
MOUNT LOVENIA
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EXPLORER PEAK
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CLEVELAND PEAK
ASHLEY
EAST BASIN
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LAMOTTE PEAK
RED KNOB
KLETTING PEAK
HAYDEN PEAK
MOUNT AGASSIZ
OSTLER PEAK
TARWEED FLAT
Controlled Surface Use
No Lease
No Surface Occupancy
Standard Lease Term
Timing Limitation
Timing Limitation & Controlled Surface Use
Appeal Settlement Zone Boundary
High Uintas Wilderness
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Management Areas
Forest Boundary
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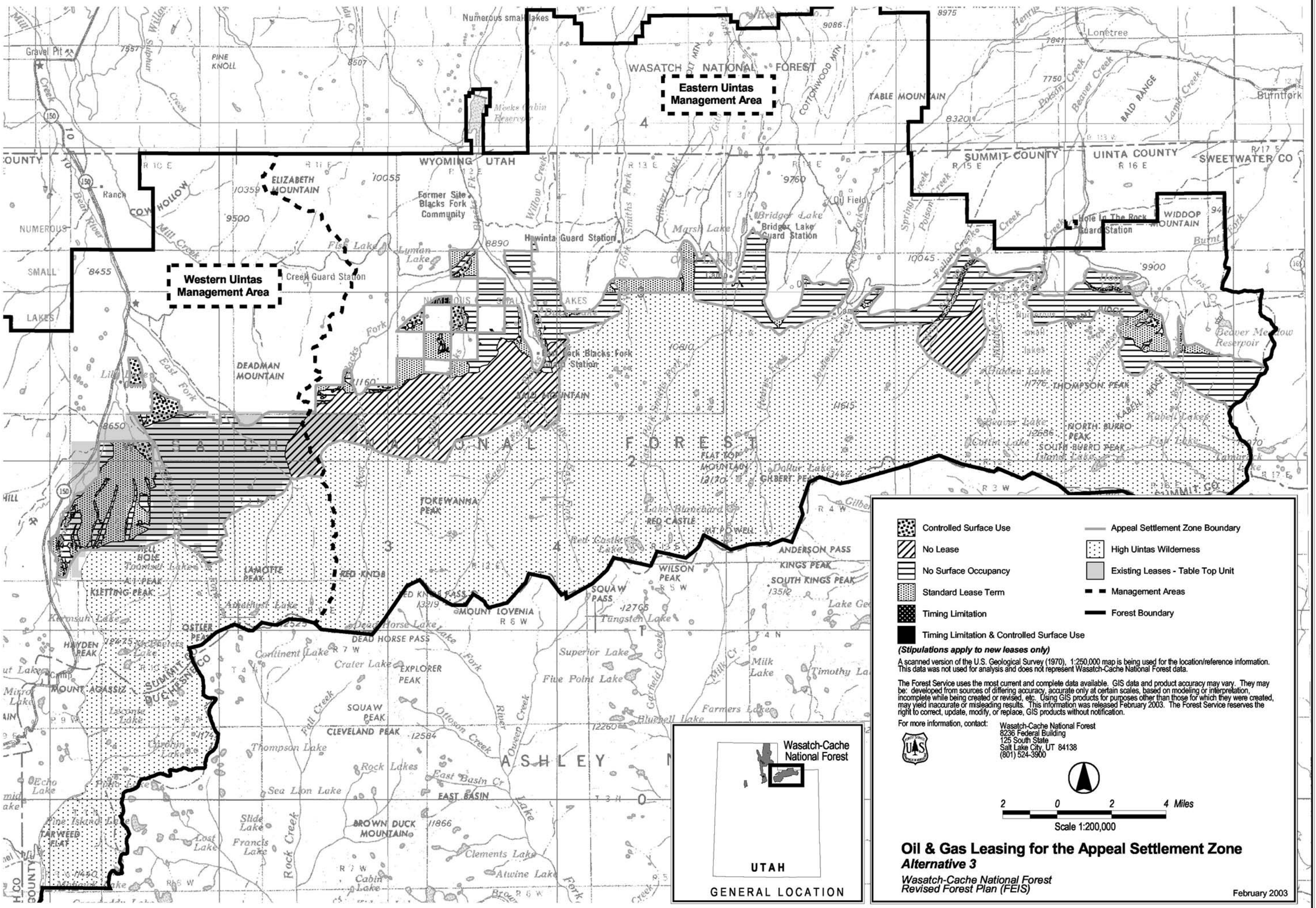
(801) 524-3900
2 0 2 4 Miles
Scale 1:200,000
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Oil & Gas Leasing for the Appeal Settlement Zone
Alternative 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003

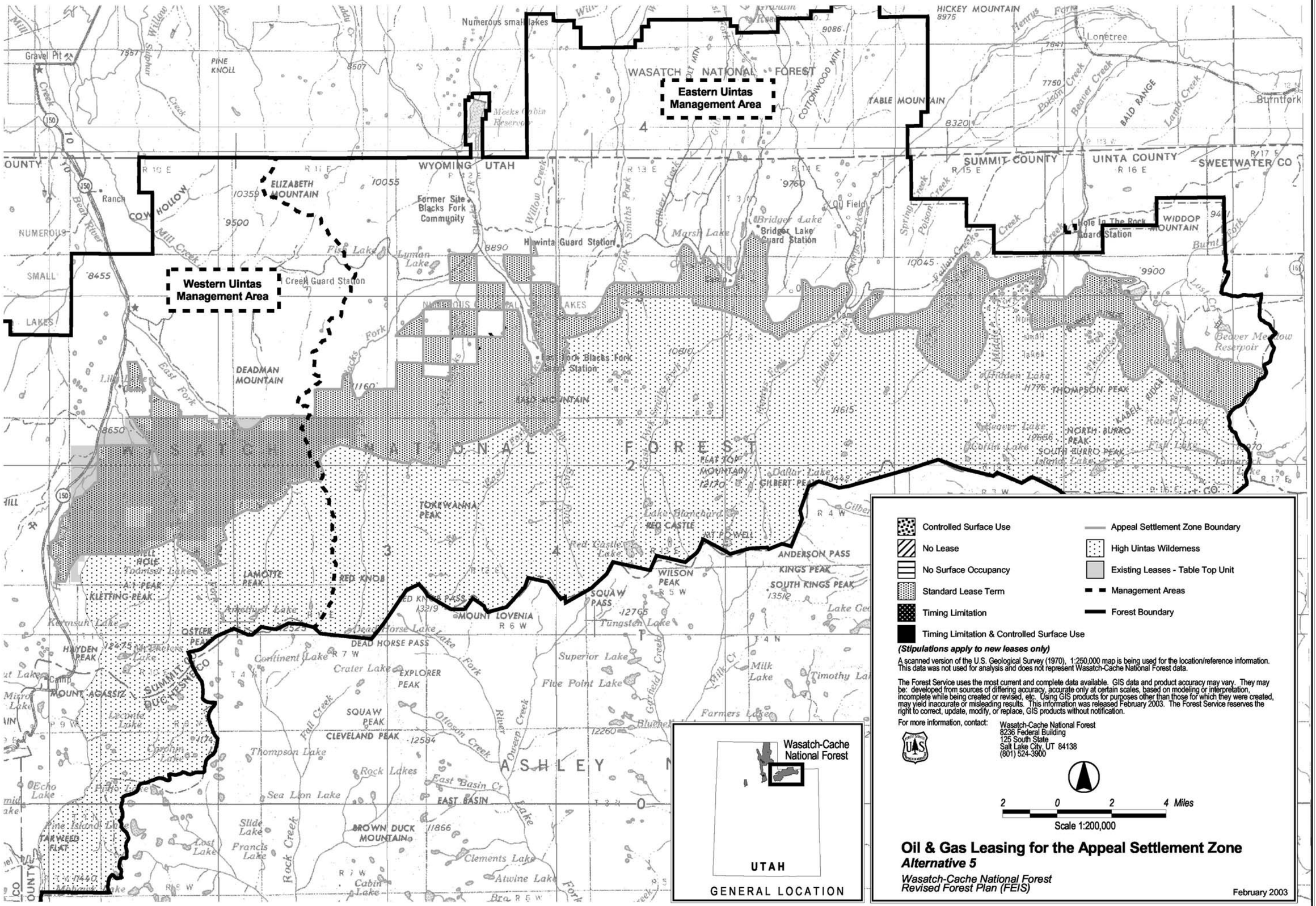


Oil & Gas Leasing for the Appeal Settlement Zone

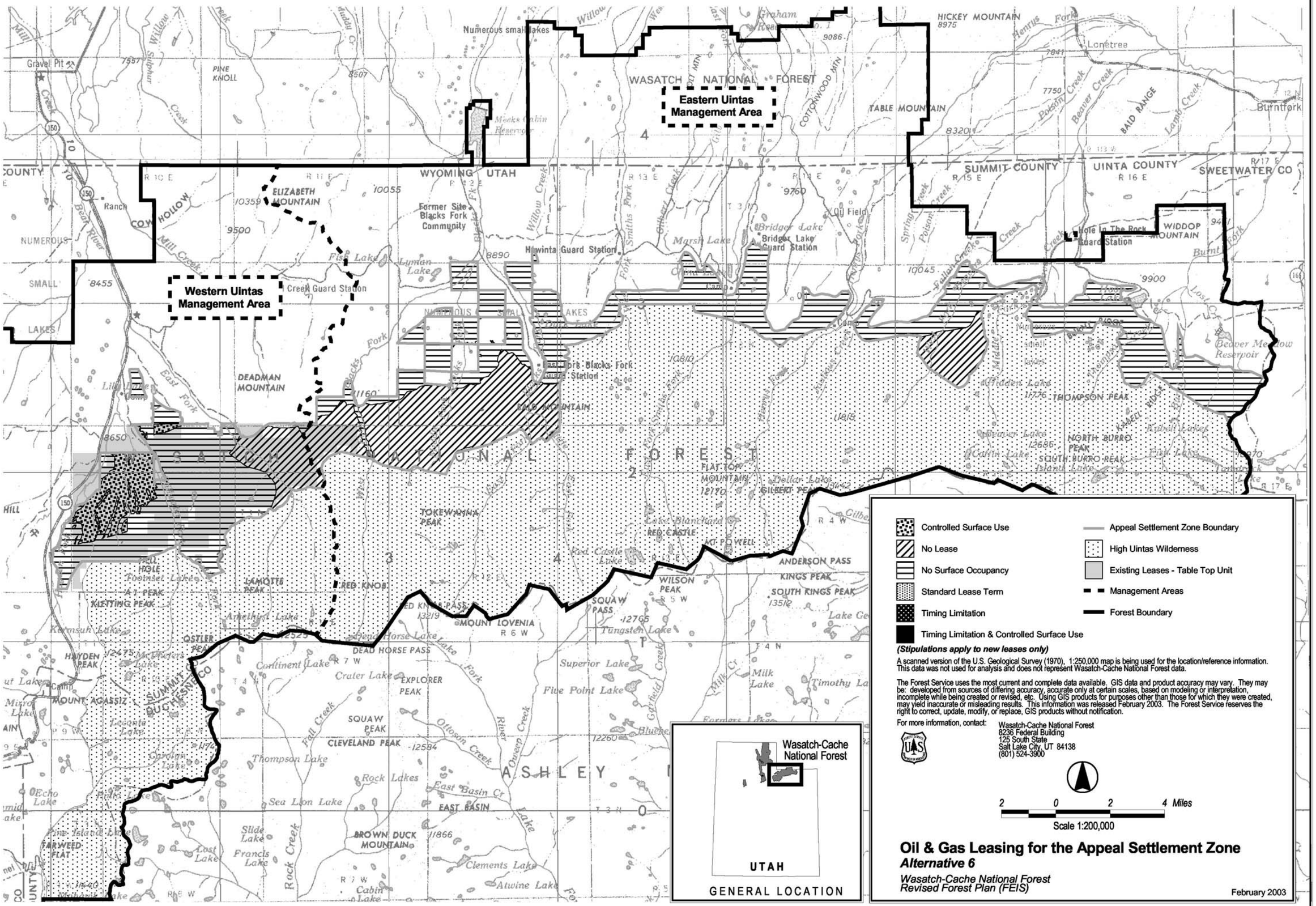
Alternative 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003



Oil & Gas Leasing for the Appeal Settlement Zone
Alternative 5
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Eastern Uintas Management Area
Western Uintas Management Area
WASATCH NATIONAL FOREST
WYOMING
UTAH
SUMMIT COUNTY
UINTA COUNTY
SWEETWATER CO
ELIZABETH MOUNTAIN
DEADMAN MOUNTAIN
HICKEY MOUNTAIN
TABLE MOUNTAIN
BALD RANGE
WIDDOP MOUNTAIN
Numerous small lakes
Meeks Cabin Reservoir
Beaver Meadow Reservoir
Bridger Lake
Bridger Lake Guard Station
Haywinta Guard Station
Hole In The Rock Guard Station
Former Site Blacks Fork Community
East Fork Blacks Fork Guard Station
Creek Guard Station
THOMPSON PEAK
NORTH BURRO PEAK
SOUTH BURRO PEAK
FLAT TOP MOUNTAIN
GILBERT PEAK
TOKEWANNA PEAK
RED CASTLE
MT POWELL
ANDERSON PASS
KINGS PEAK
SOUTH KINGS PEAK
WILSON PEAK
SQUAW PASS
MOUNT LOVENIA
DEAD HORSE PASS
EXPLORER PEAK
SQUAW PEAK
CLEVELAND PEAK
ASHLEY
EAST BASIN
BROWN DUCK MOUNTAIN
RED KNOB
LAMOTTE PEAK
KLETTING PEAK
HAYDEN PEAK
MOUNT AGASSIZ
OSTLER PEAK
FARWEED FLAT
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Controlled Surface Use
No Lease
No Surface Occupancy
Standard Lease Term
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Timing Limitation & Controlled Surface Use
Appeal Settlement Zone Boundary
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Existing Leases - Table Top Unit
Management Areas
Forest Boundary
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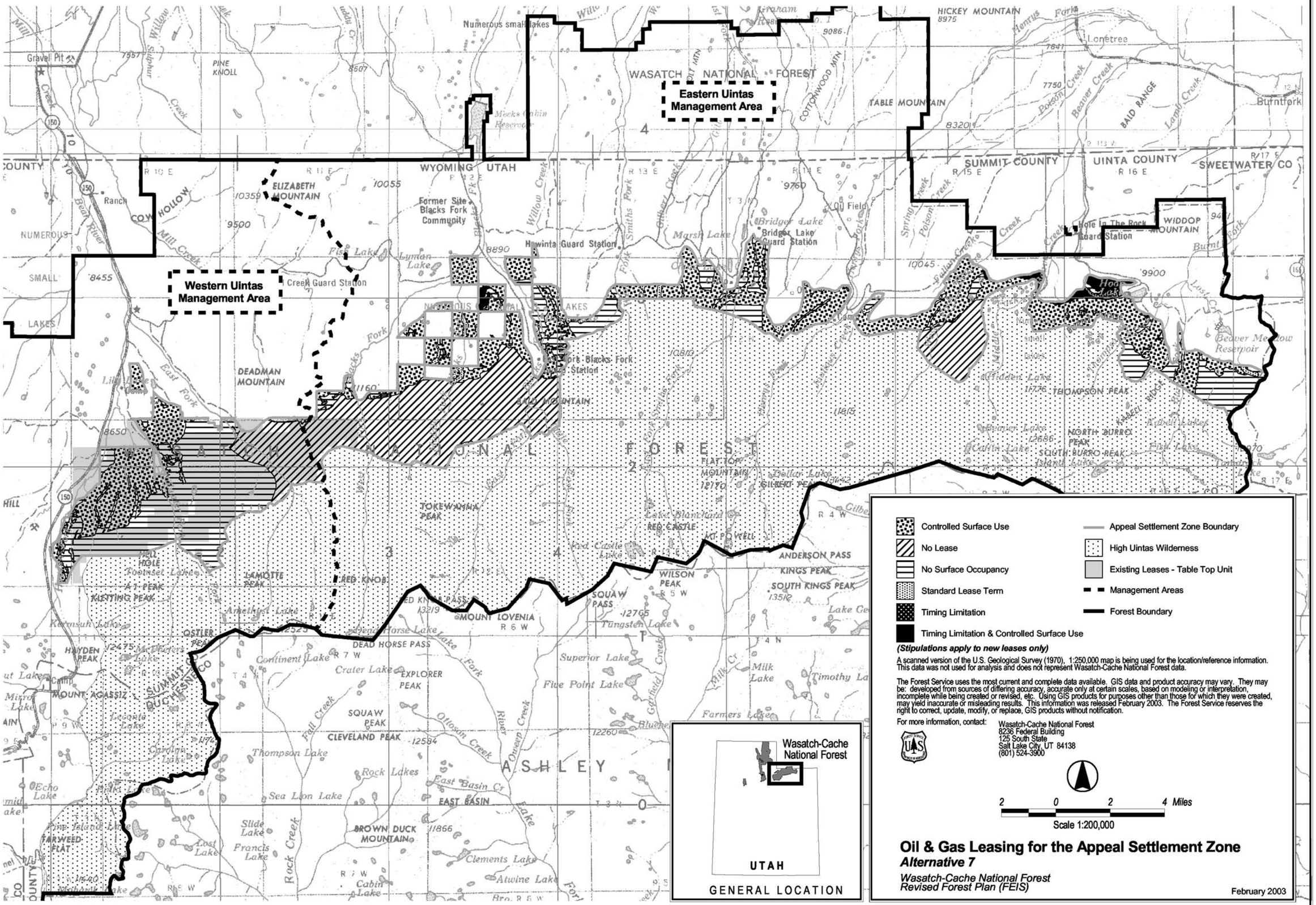
2 0 2 4 Miles
Scale 1:200,000
Oil & Gas Leasing for the Appeal Settlement Zone
Alternative 6
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003



Oil & Gas Leasing for the Appeal Settlement Zone

Alternative 7

Wasatch-Cache National Forest
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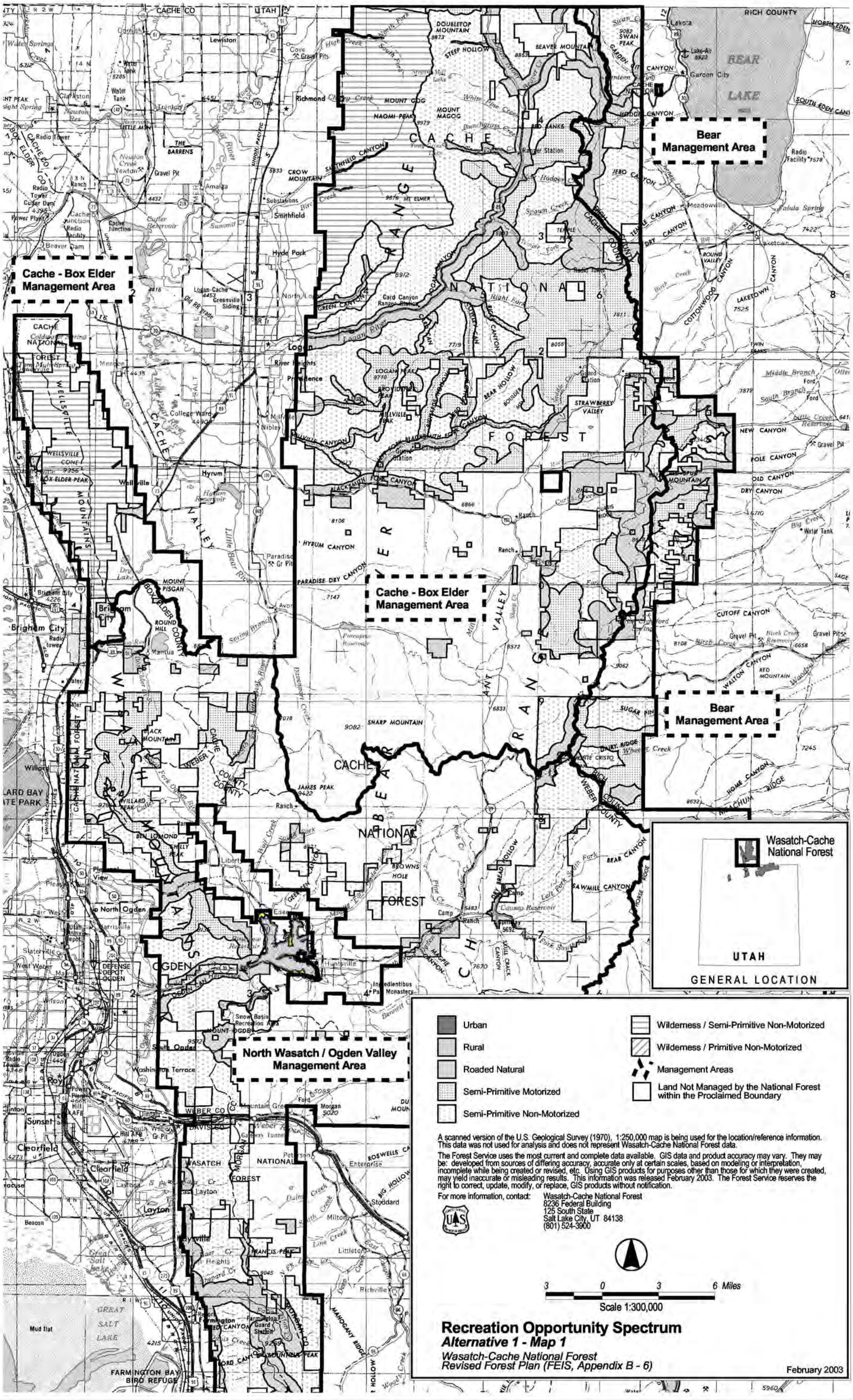
February 2003


Cache - Box Elder Management Area
Bear Management Area
Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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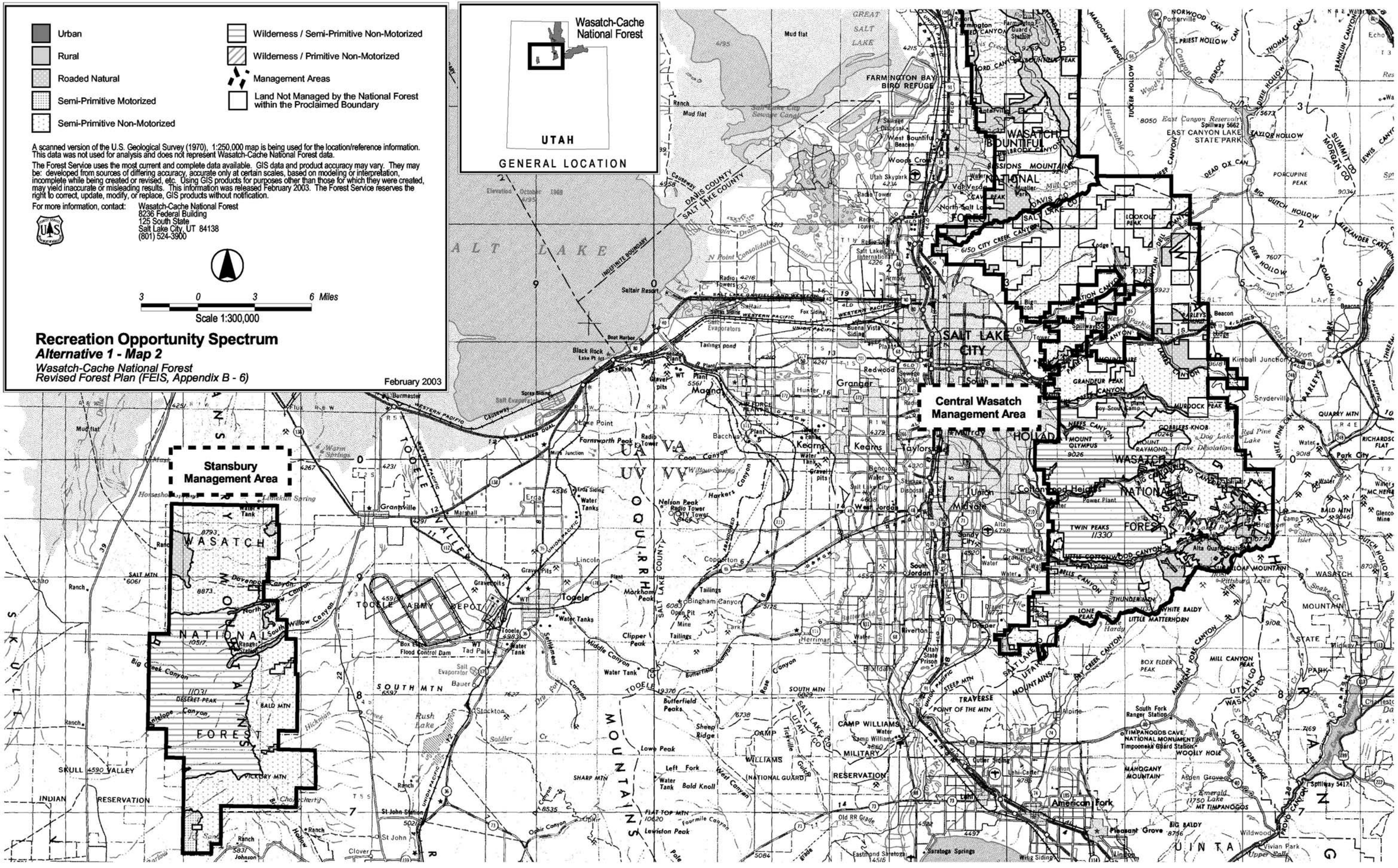
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 1 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
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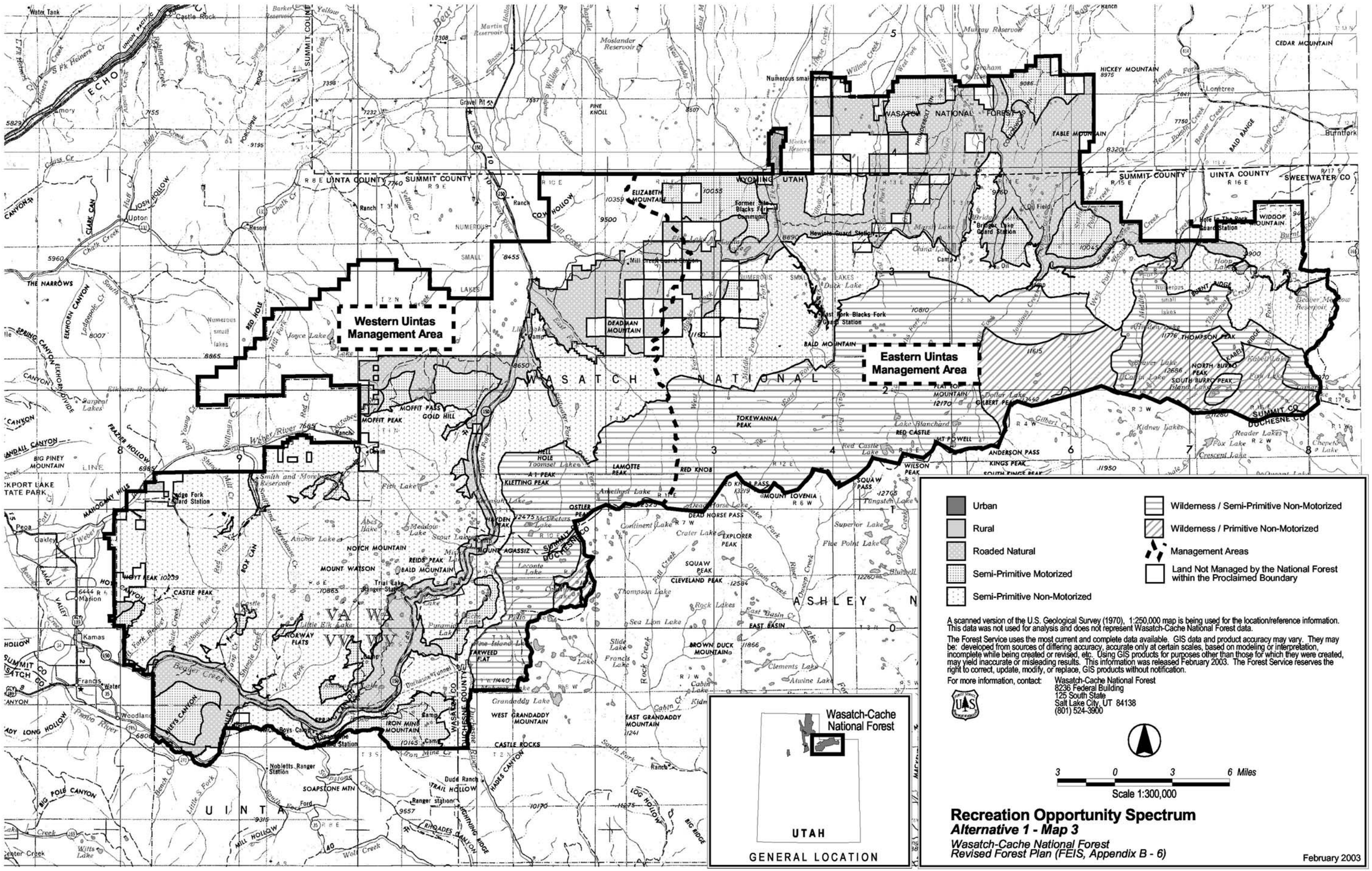
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 1 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
FARMINGTON BAY BIRD REFUGE
EAST CANYON LAKE STATE PARK
TOOELE ARMY DEPOT
SOUTH MTN
SKULL VALLEY
INDIAN RESERVATION
CAMP WILLIAMS MILITARY RESERVATION
WILLIAMS (NATIONAL GUARD)
TIMPANOGOS CAVE NATIONAL MONUMENT
UINTA NATIONAL FOREST

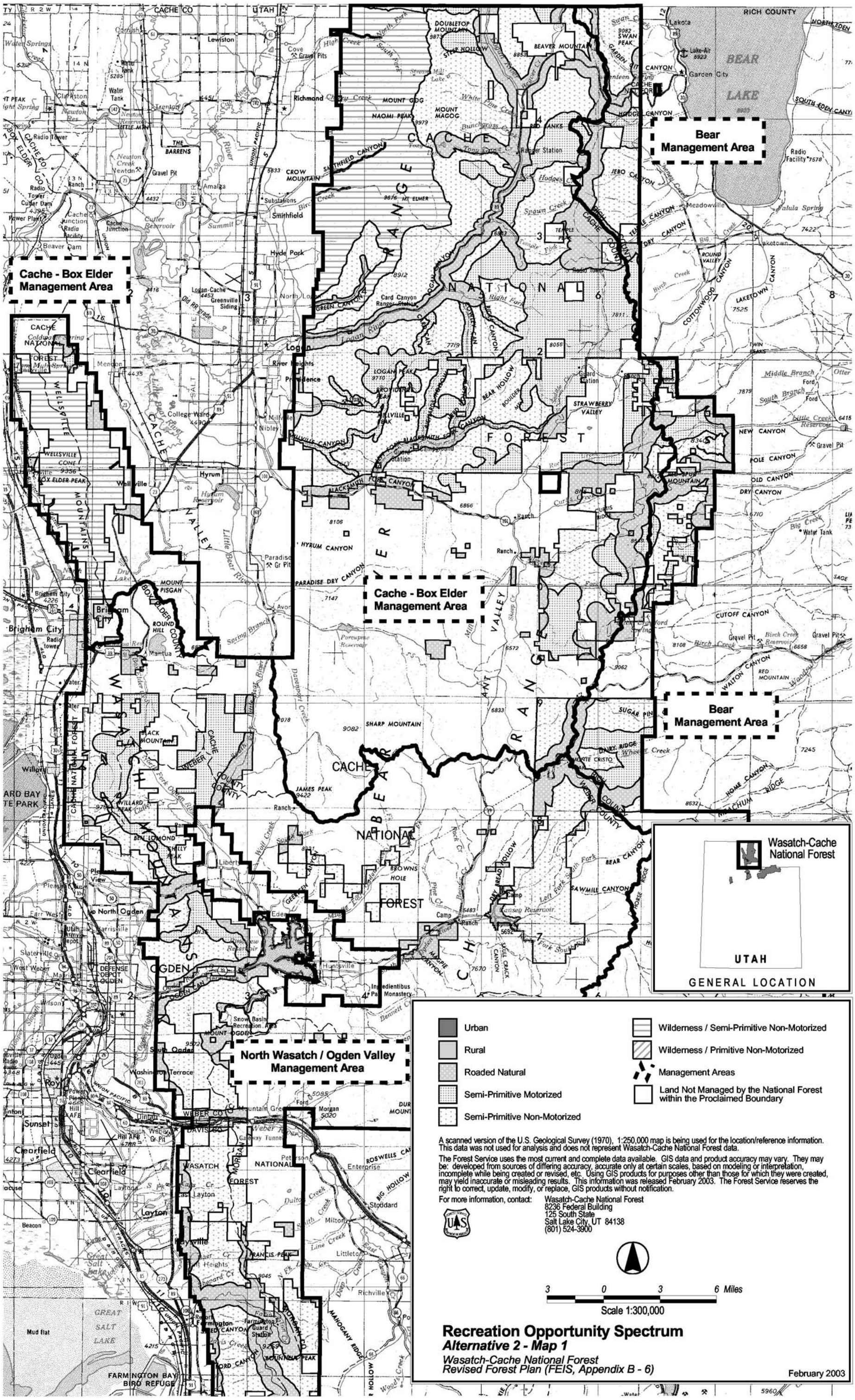


Recreation Opportunity Spectrum

Alternative 1 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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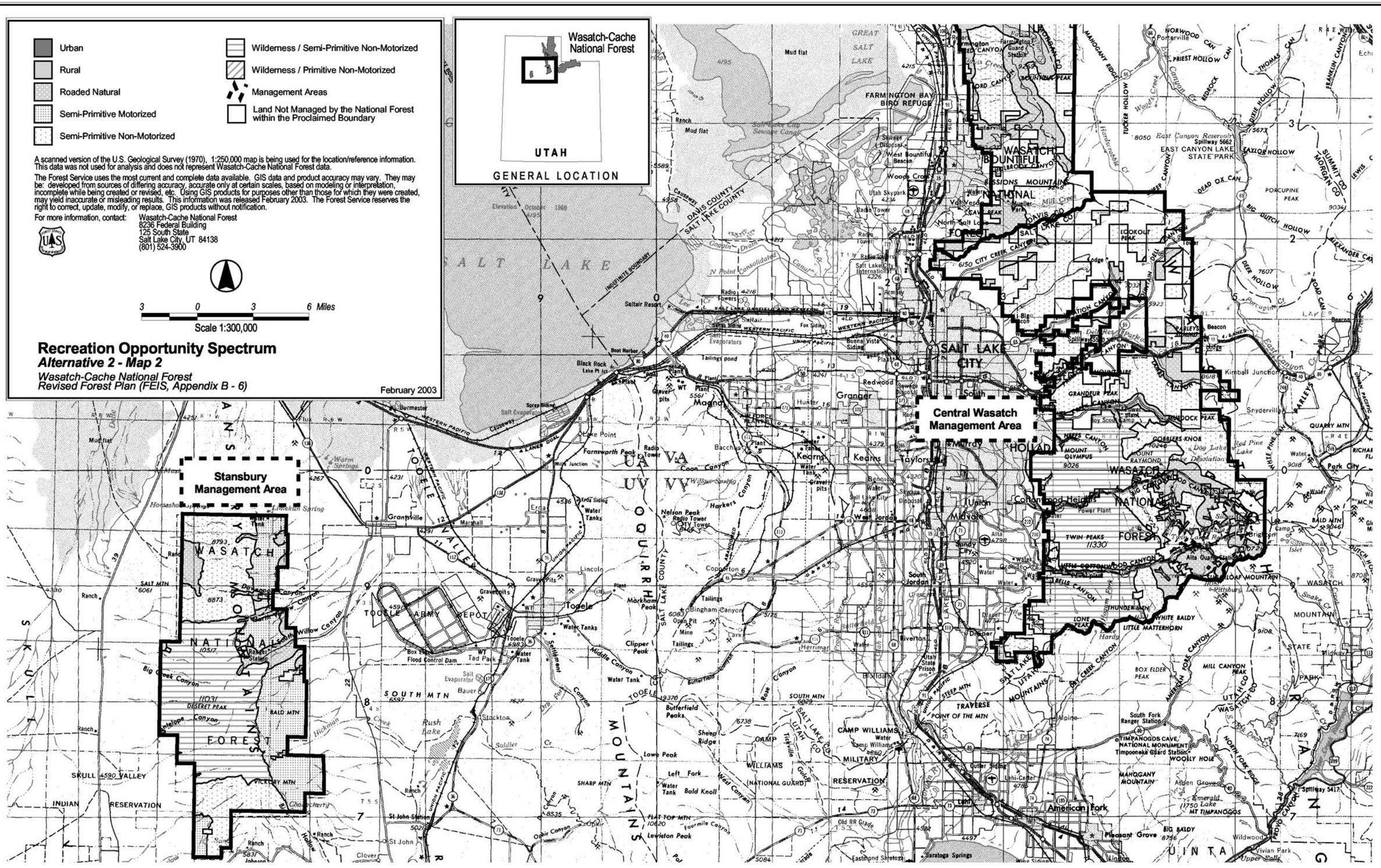
For more information, contact:
Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 2 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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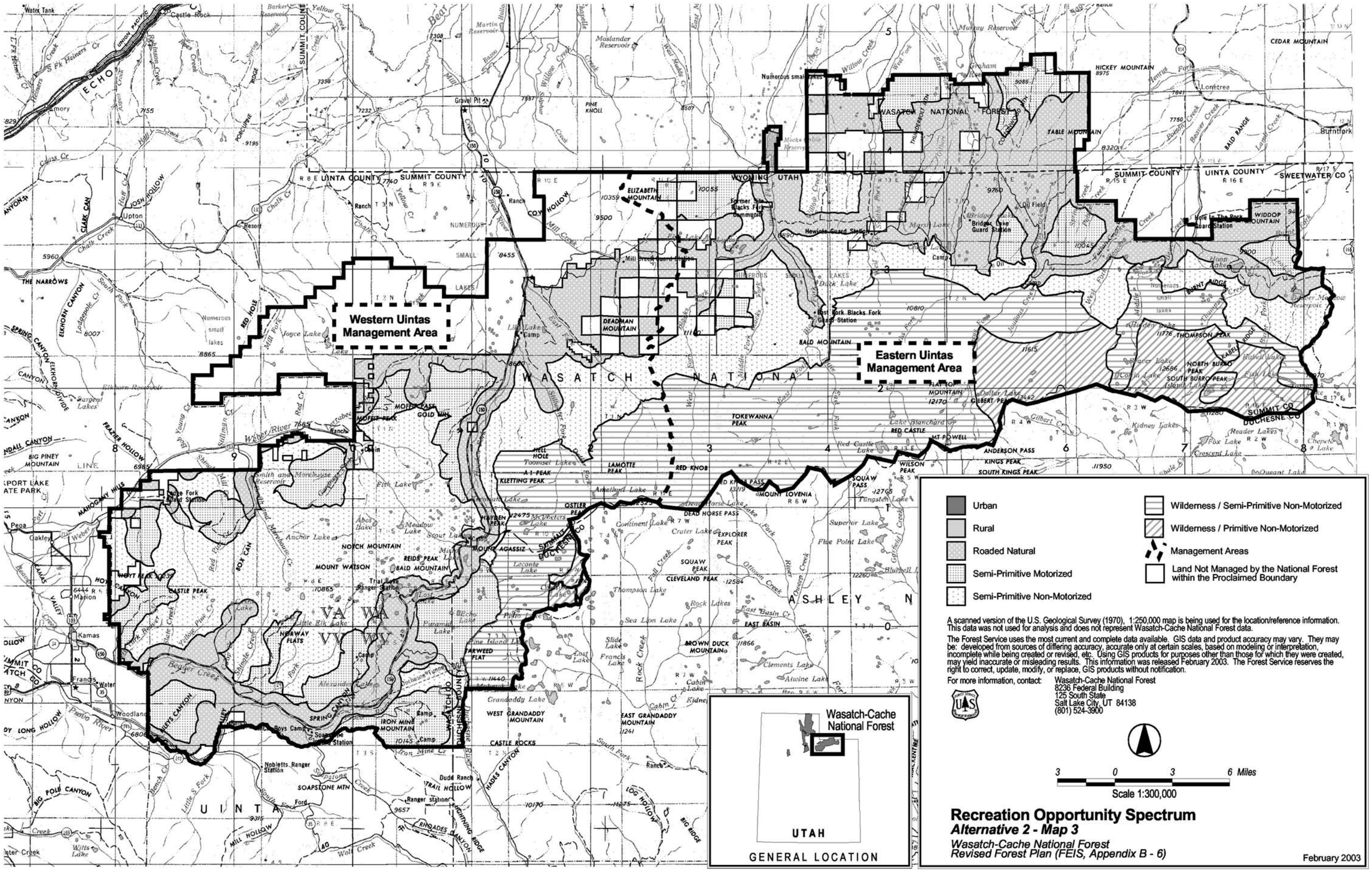
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 2 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Stansbury Management Area
Central Wasatch Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
GREAT SALT LAKE
FARMINGTON BAY BIRD REFUGE
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
UINTA MOUNTAINS
OQUIRRH MOUNTAINS
SKULL VALLEY INDIAN RESERVATION

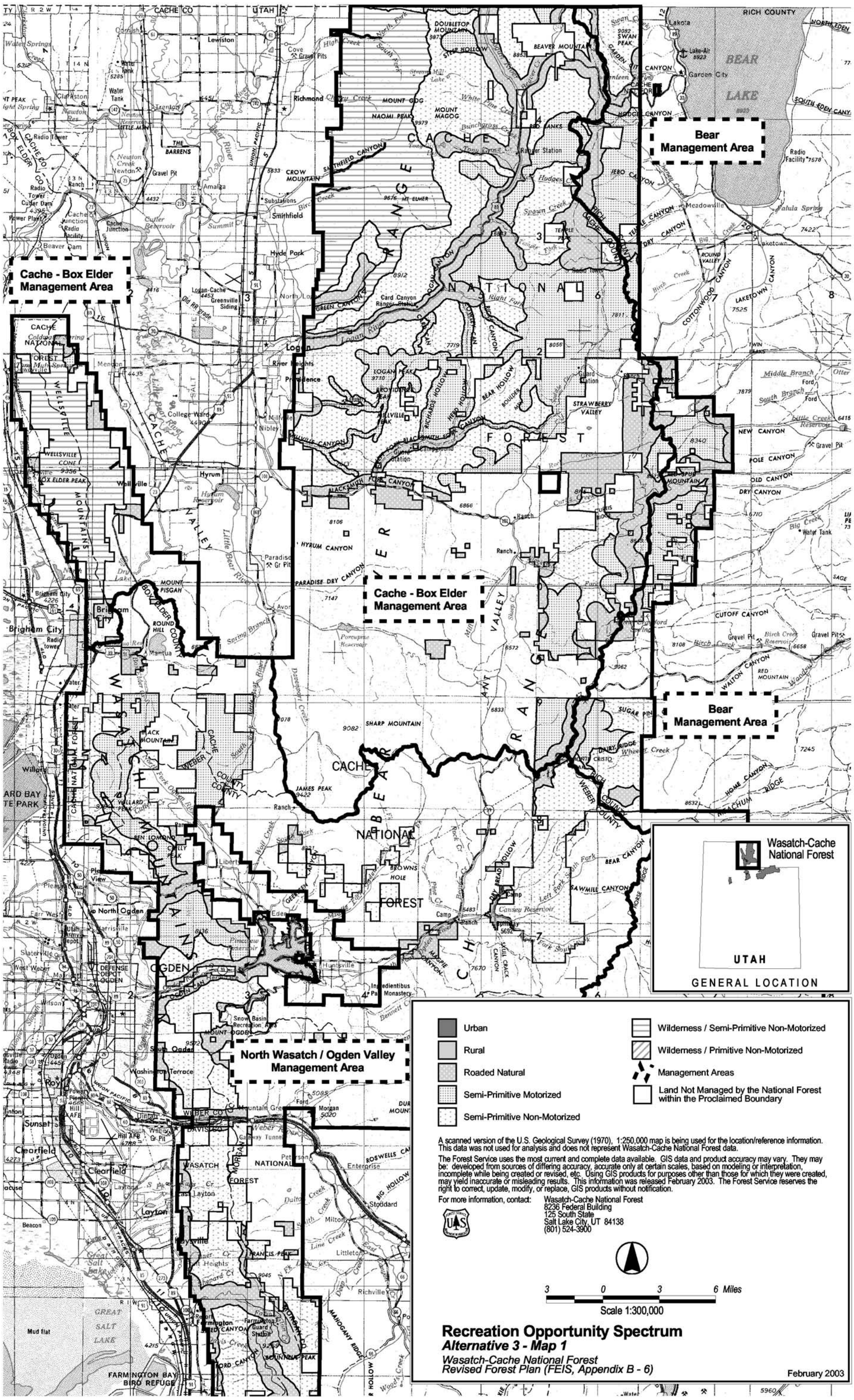


Recreation Opportunity Spectrum

Alternative 2 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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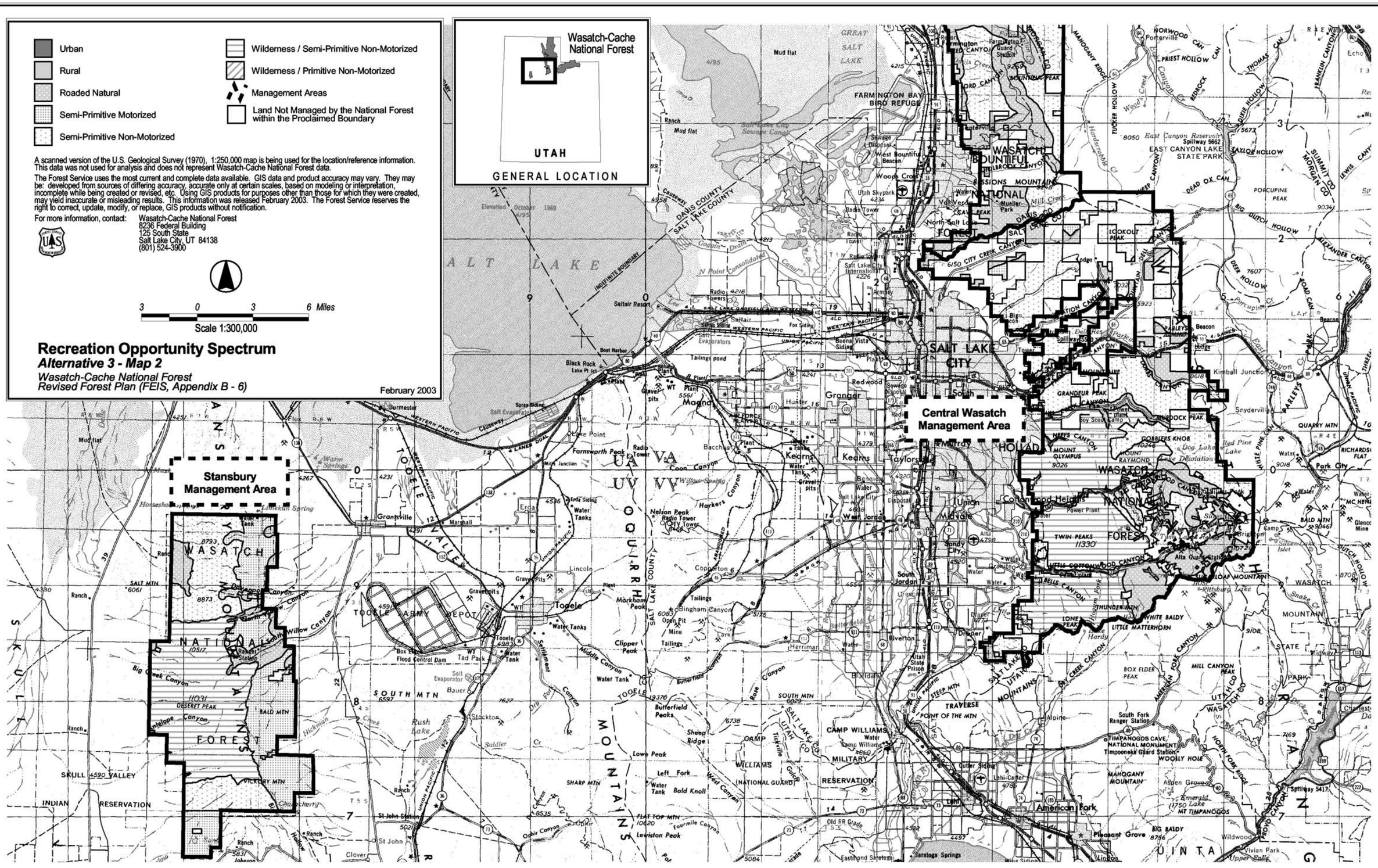
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 3 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
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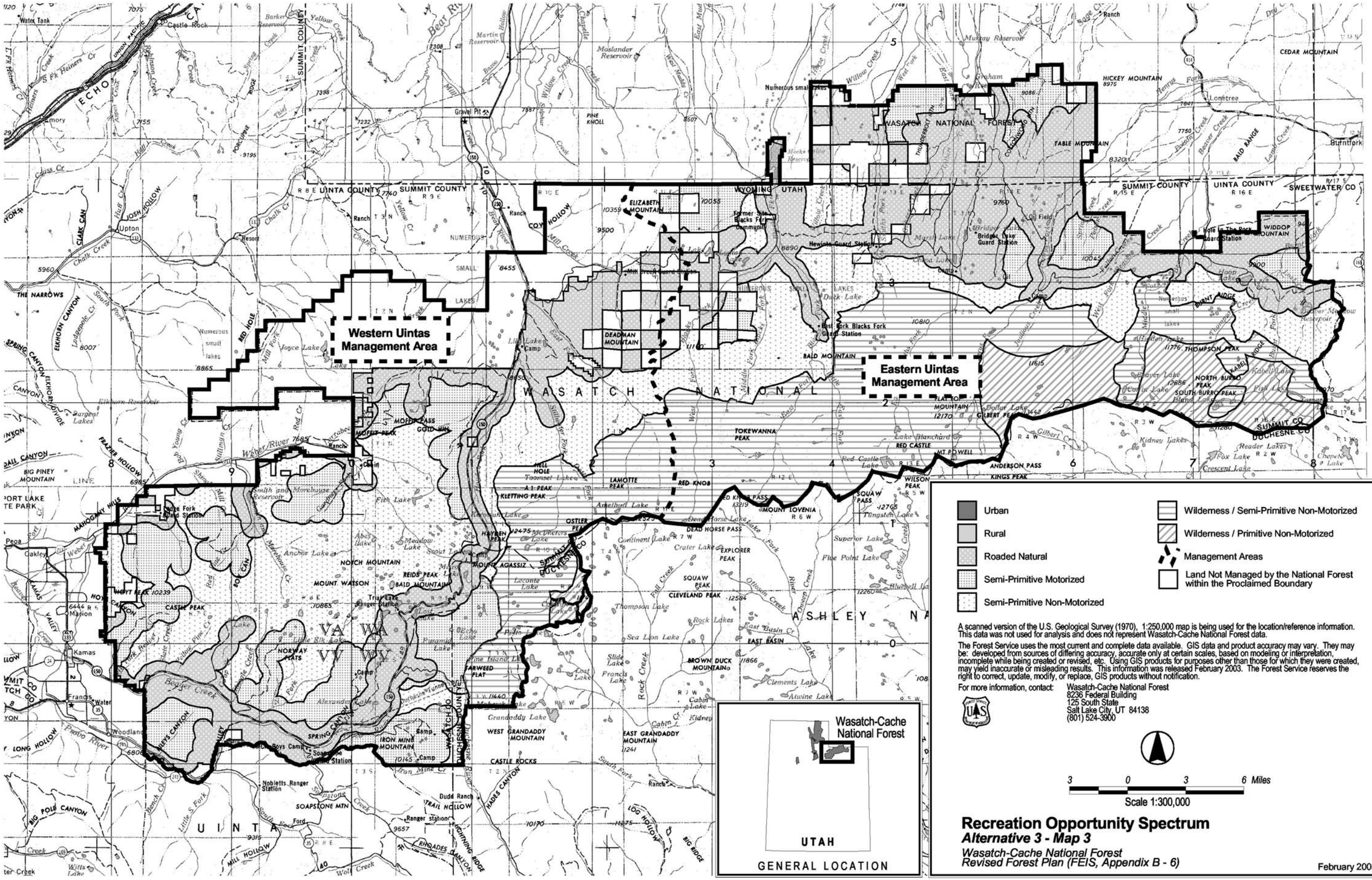
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 3 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
GREAT SALT LAKE
FARMINGTON BAY BIRD REFUGE
TOOELE ARMY DEPOT
Tooele
Grantsville
Kearns
Taylorsville
West Jordan
Sandy
Draper
Riverton
Herriman
Bluffdale
Alpine
American Fork
Pleasant Grove
Lehi
Saratoga Springs
Eastmond Saratoga
Lake Point
Stockton
Bauer
Clover
St John
Lincoln
Copperton
Bingham Canyon
Midvale
Union
Cottonwood Heights
Holladay
Snyderville
Park City
Kimball Junction
Wildwood
Vivian Park
Upper Falls
Aspen Grove
Emerald (1750 Lake MT TIMPANOGOS
Timpooneke Guard Station
TIMPANOGOS CAVE NATIONAL MONUMENT
South Fork Ranger Station
Saltair Resort
Black Rock
Boat Harbor
Burmester
Farmington
Bountiful
Woods Cross
Salt Lake City International
Mud flat
Causeway
DAVIS COUNTY
SALT LAKE COUNTY
INDEFINITE BOUNDARY
WESTERN PACIFIC
UNION PACIFIC
SALT LAKE GARFIELD AND WESTERN
TOOELE VALLEY
OQUIRRH MOUNTAINS
SOUTH MTN
SKULL VALLEY
INDIAN RESERVATION
CAMP WILLIAMS MILITARY RESERVATION
WILLIAMS (NATIONAL GUARD)
TRAVERSE MOUNTAINS
UINTA MOUNTAINS
WASATCH MOUNTAINS
EAST CANYON LAKE STATE PARK
EAST CANYON Reservoir
Spillway 5662
Spillway 5417
DESERET PEAK
BALD MTN
VICKERY MTN
SALT MTN
TWIN PEAKS 11330
LONE PEAK
THUNDER MTN
WHITE BALDY
LITTLE MATTERHORN
MOUNT OLYMPUS 9026
MOUNT RAYMOND
GRANDEUR PEAK
GOBBLERS KNOB
QUARRY MTN
BIG BALDY 8796
MAHOGANY MOUNTAIN
WOOLLY HOLLOW
BOX ELDER PEAK
MILL CANYON PEAK
PORCUPINE PEAK
LOOKOUT PEAK
FLAT TOP MTN 10620
Lewiston Peak
Bald Knoll
Farnsworth Peak
Nelson Peak
Clipper Peak
Markham Peak
Butterfield Peaks
Sheep Ridge
Lowe Peak
SHARP MTN
Rush Lake
Soldier Cr
Willow Canyon
Big Creek Canyon
Antelope Canyon
Dry Canyon
Middle Canyon
Hickman
Harkers Canyon
Coon Canyon
Ophir Canyon
Fourmile Canyon
Old RR Grade
Tooele Flood Control Dam
Box Elder
Salt Evaporator
Tad Park
Water Tanks
Gravel pits
Tailings
Tailings pond
Sewage Disposal
Salt Lake City Sewage Canal
Radio Tower
Power Plant
Ranger Station
Alta Guard Station
Boy Scout Camp
Utah State Prison
Utah Skypark
Mueller Park
Big Cottonwood Canyon
Little Cottonwood Canyon
Parleys Canyon
Emigration Canyon
Millcreek Canyon
Red Pine Lake
Dog Lake
Lake Desolation
Pittsburg Lake
Snake Cr
Echo
Wanship
Coalville
Morgan
Henefer
Devil's Slide
Ranch
Warm Springs
Limekiln Spring
Horseshoe Spring



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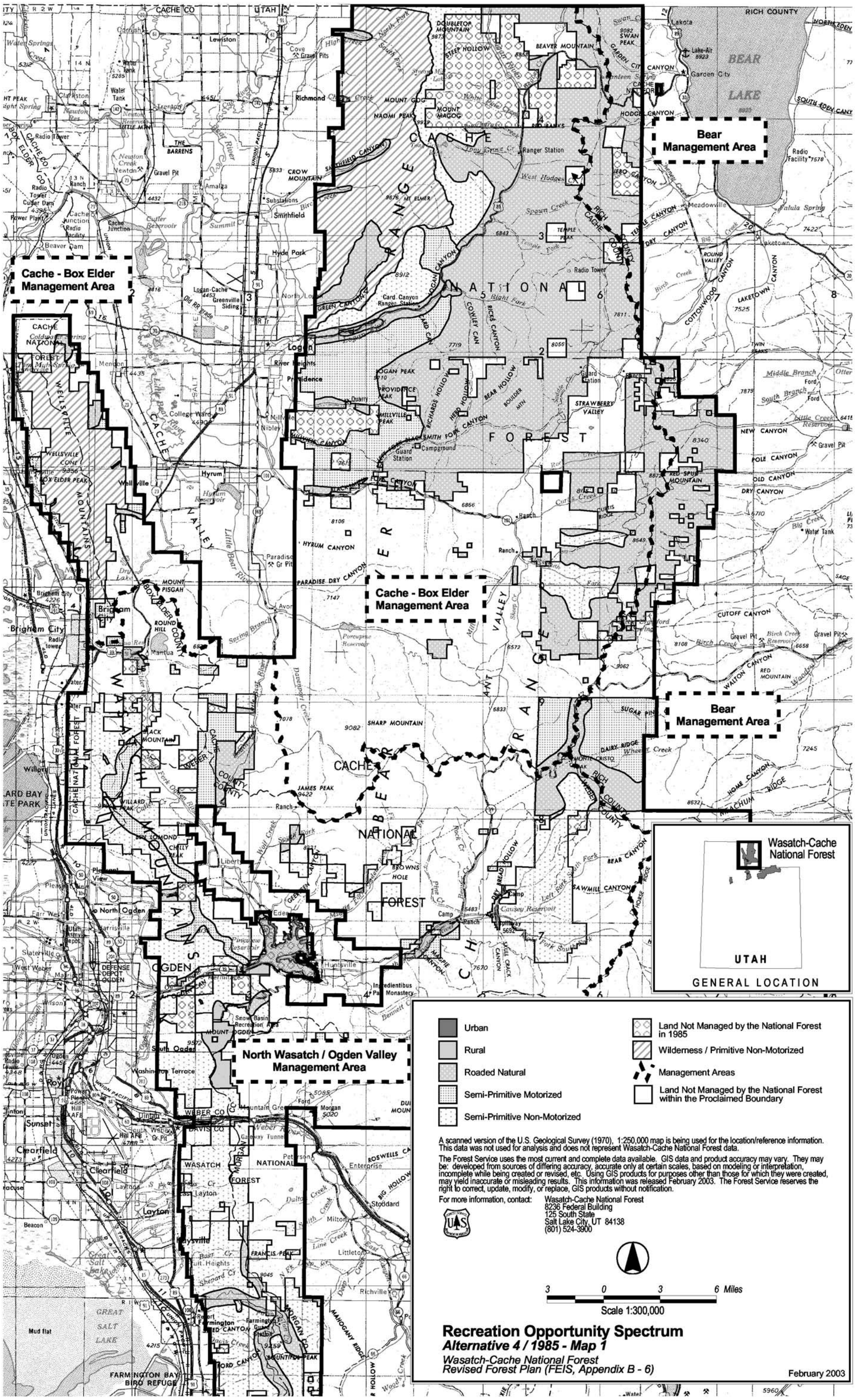
Recreation Opportunity Spectrum

Alternative 3 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Land Not Managed by the National Forest in 1985
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 4 / 1985 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003

- Urban
- Rural
- Roaded Natural
- Semi-Primitive Motorized
- Semi-Primitive Non-Motorized
- Land Not Managed by the National Forest in 1985
- Wilderness / Primitive Non-Motorized
- Management Areas
- Land Not Managed by the National Forest within the Proclaimed Boundary

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3 0 3 6 Miles

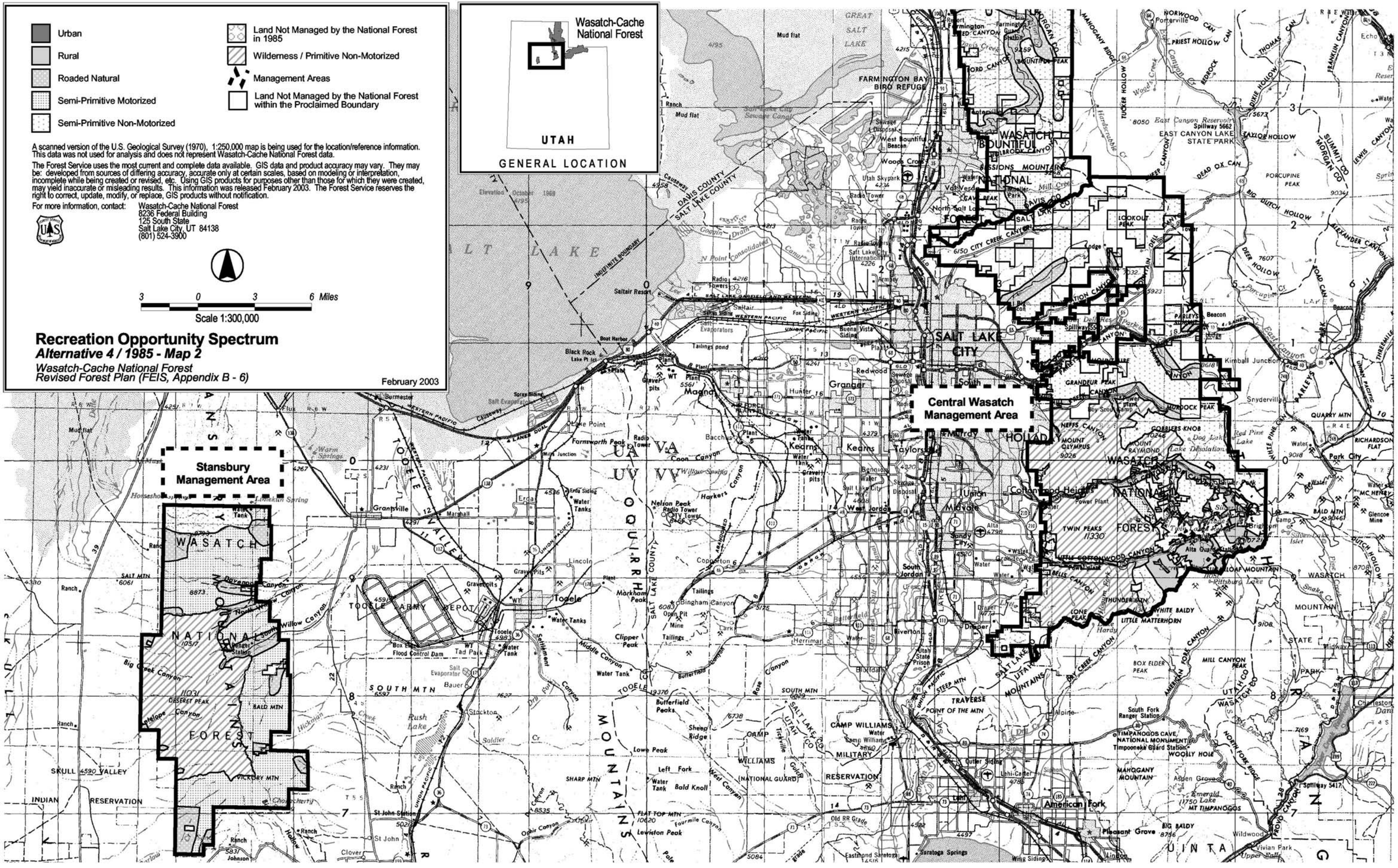
Scale 1:300,000

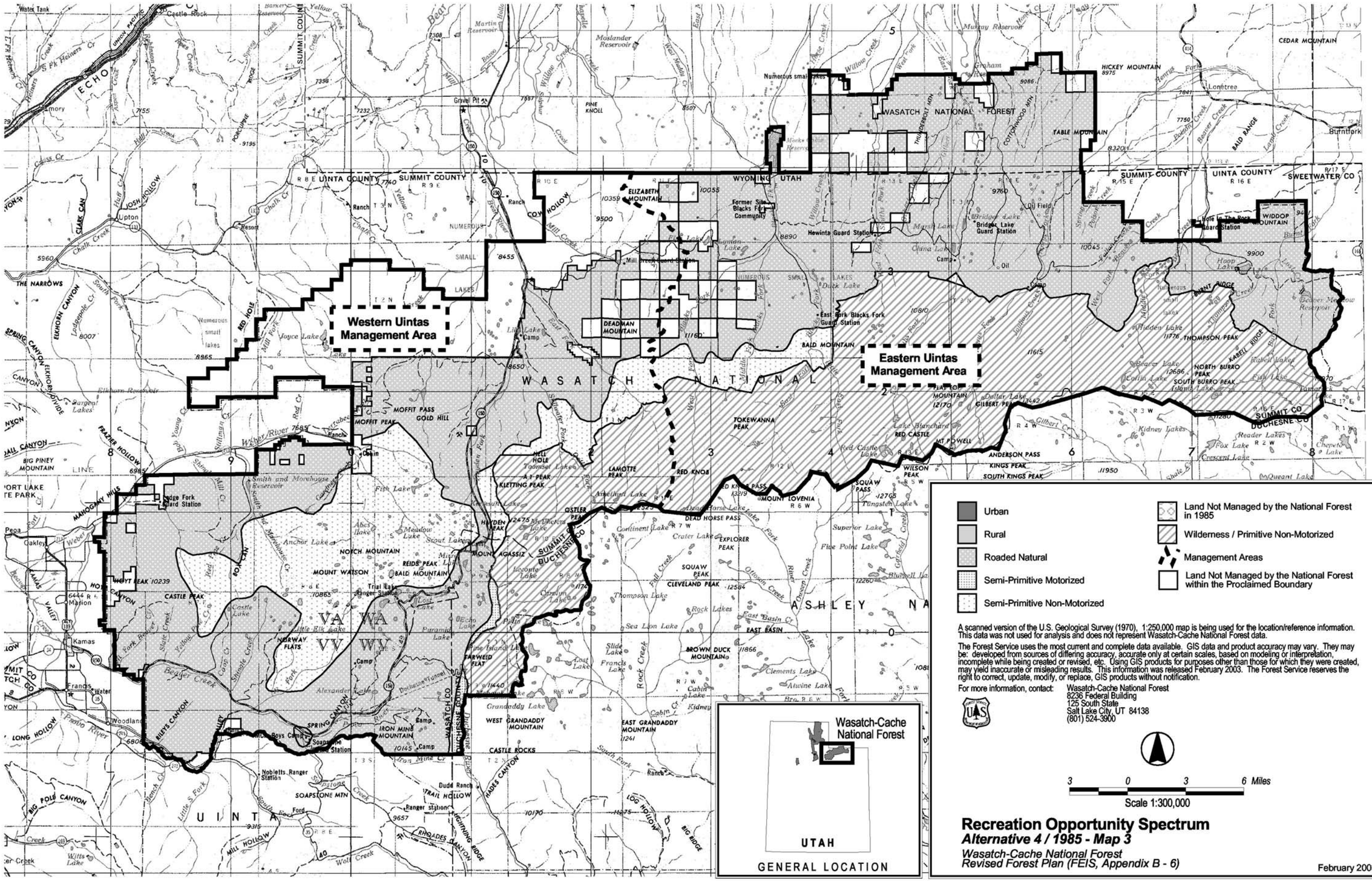
Recreation Opportunity Spectrum

Alternative 4 / 1985 - Map 2

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003





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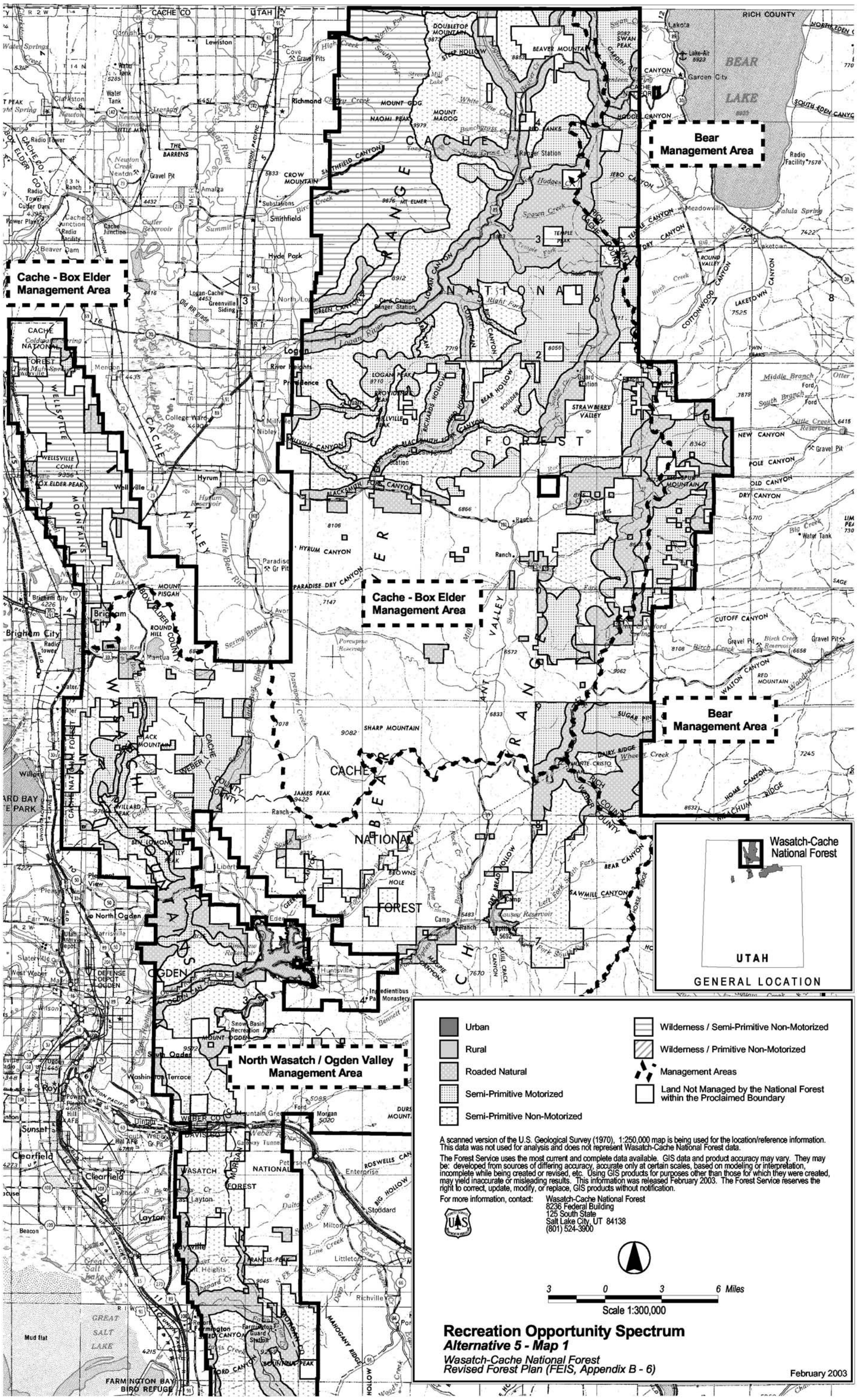
Recreation Opportunity Spectrum

Alternative 4 / 1985 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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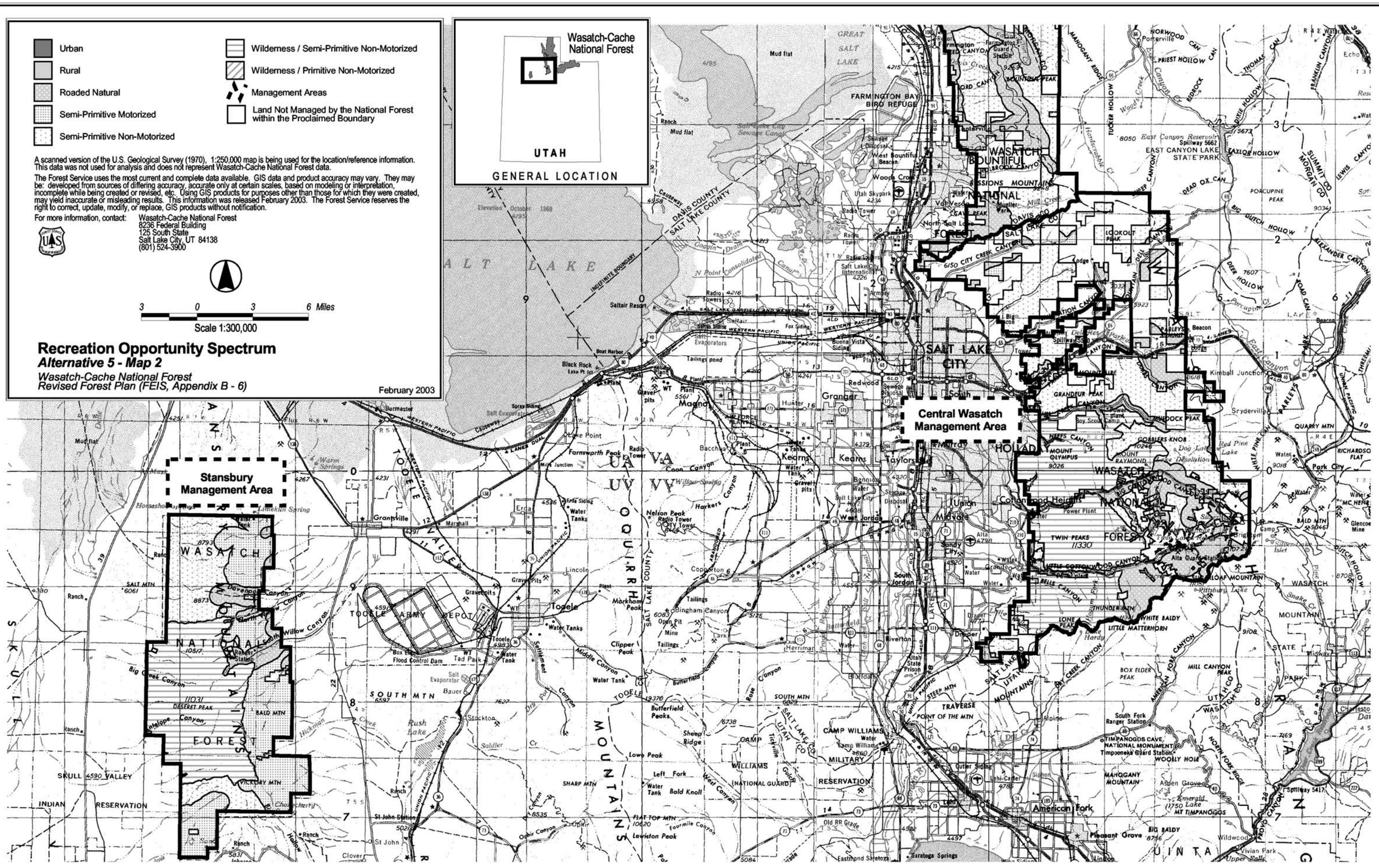
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 5 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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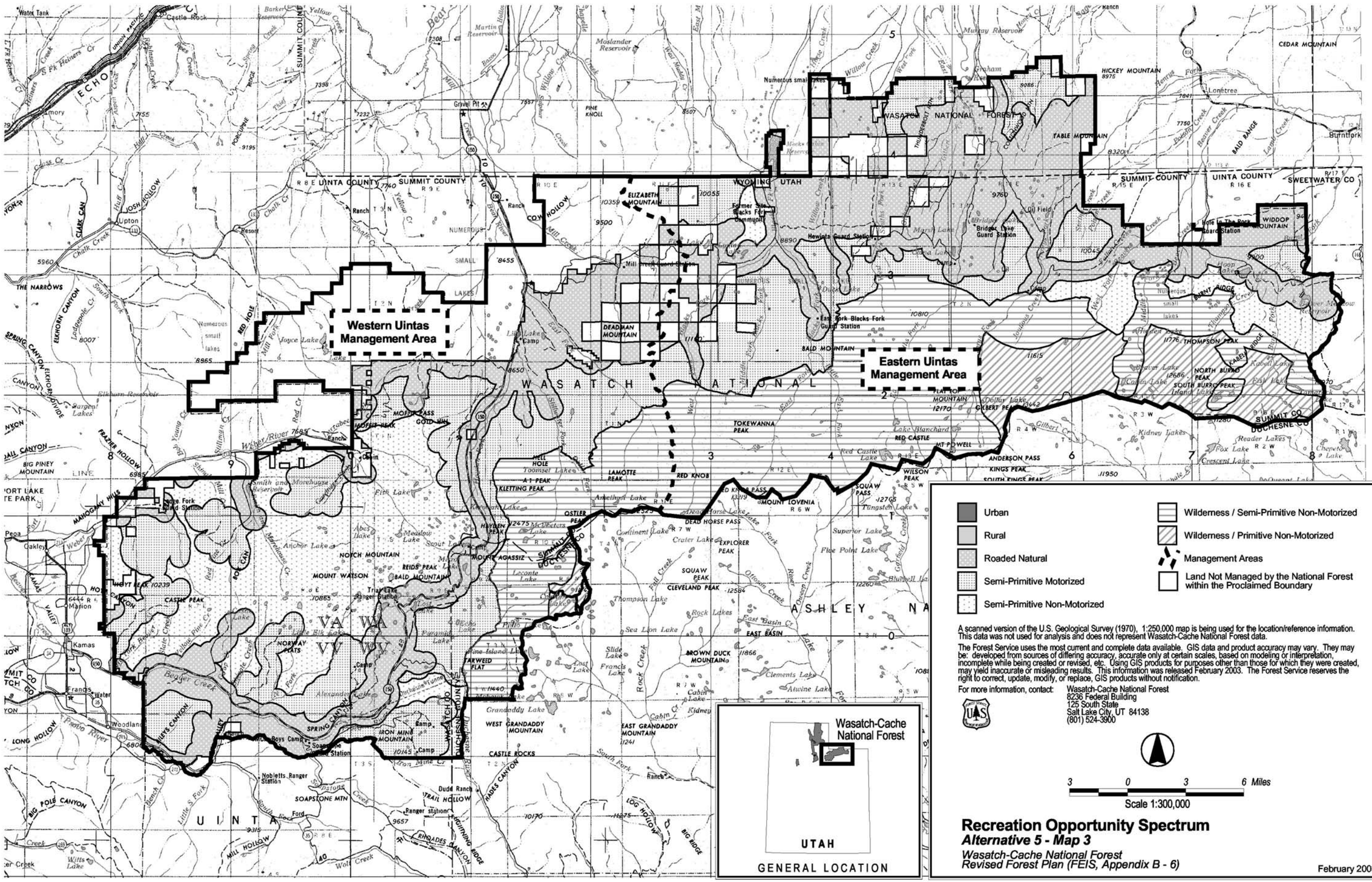
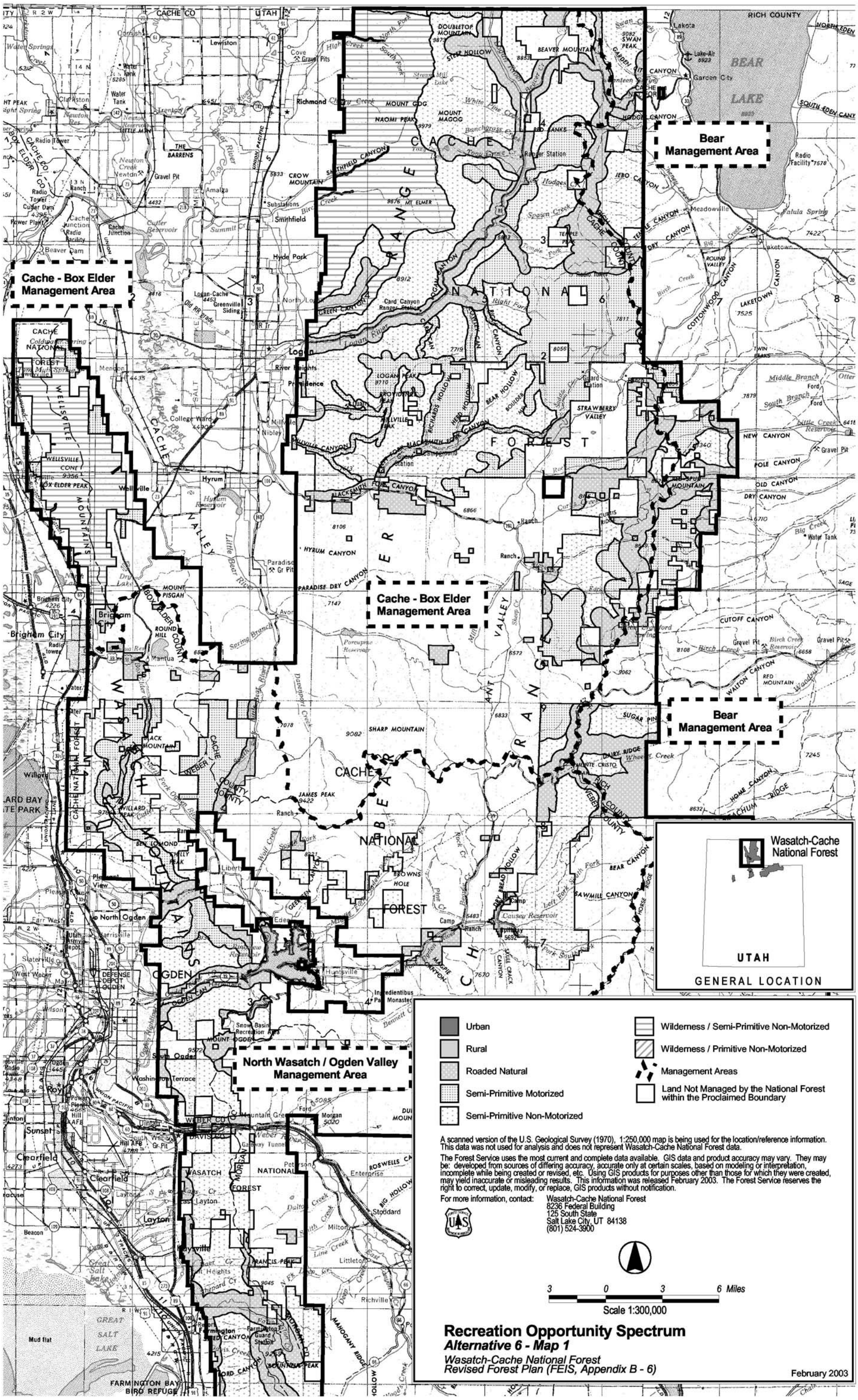
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 5 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
GREAT SALT LAKE
FARMINGTON BAY BIRD REFUGE
TOOELE ARMY DEPOT
TOOELE VALLEY
OQUIRRH MOUNTAINS
SOUTH MTN
CAMP WILLIAMS MILITARY RESERVATION
TRAVERSE MOUNTAINS
WASATCH MOUNTAINS
UINTA MOUNTAINS
SKULL VALLEY INDIAN RESERVATION
EAST CANYON LAKE STATE PARK
American Fork
Pleasant Grove
Lehi
Saltair Resort
Black Rock
Magna
Granger
Kearns
Taylorsville
West Jordan
Sandy
Draper
Riverton
Herriman
Tooele
Grantsville
Stockton
Lake Point
Bacchus
Erda
Lincoln
Copperton
Bingham Canyon
Alpine
Saratoga Springs
Eastmond Saratoga
Clover
St John
Burmester
Flux
Garfield
Hunter
Redwood
Bennion
Union
Midvale
Cottonwood Heights
Holladay
Millcreek
Kimball Junction
Sryderville
Park City
Coalville
Morgan
Echo
Wanship
Peterson
Farmington
Bountiful
Woods Cross
Centerville
Mud flat
Salt Lake City Sewage Canal
Causeway
DAVIS COUNTY
SALT LAKE COUNTY
WEST INTE BOUNDARY
Elevated October 1969
Fornsworth Peak
Nelson Peak
Markham Peak
Clipper Peak
Butterfield Peaks
Lowe Peak
Bald Knoll
Lewiston Peak
FLAT TOP MTN
SHARP MTN
VICTORY MTN
DESERET PEAK
BALD MTN
SALT MTN
Willow Canyon
Big Creek Canyon
Antelope Canyon
Dry Canyon
Middle Canyon
Settlement Canyon
Rush Lake
Harkers Canyon
Coon Canyon
Bingham Canyon
Butterfield Canyon
Rose Canyon
Ophir Canyon
Fourmile Canyon
West Canyon
Tickville Gulch
Soldier Cr
Hickman Hollow
Horseshoe Springs
Warm Springs
Limekiln Spring
Willow Spring
Mud Lake
Sheep Ridge
Old RR Grade
Eastmond Saratoga
Ranch
Water Tank
Water Tanks
Gravel pits
Tailings
Tailings pond
Spray Siding
Salt Evaporators
Boat Harbor
Lake Pt Jct
Fox Siding
Buena Vista Siding
Saltair
Radio Tower
Radio Towers
Sewage Disposal
Power Plant
Boy Scout Camp
Ranger Station
Flood Control Dam
Tad Park
Bauer
Clover
Lehi-Center
Outer Siding
Utah State Prison
Alta Guard Station
Camp Williams
Timpooneka Guard Station
Timpanogos Cave National Monument
Emerald Lake
MT TIMPANOGOS
MAHOGANY MOUNTAIN
Aspen Grove
Wildwood
Vivian Park
Upper Falls
Spillway 5417
Spillway 5662
East Canyon Reservoir
Mill Creek
Big Cottonwood Canyon
Little Cottonwood Canyon
Bells Canyon
Dry Creek Canyon
Mahogany Ridge
Tucker Hollow
Thomas Can
Bedrock Can
Priest Hollow Can
Norwood Can
Franklin Canyon
Dead Ox Can
Big Dutch Hollow
Deer Hollow
Porcupine Cr
Alexander Canyon
Lewis Canyon
Summit Co
Morgan Co
Taylor Hollow
Mountain Dell Canyon
Emigration Canyon
Parleys Canyon
Mountcrest Canyon
Neffs Canyon
Mount Olympus
Mount Raymond
Grandeur Peak
Gobblers Knob
Red Pine Lake
Dog Lake
Desolation Lake
Lake Blanche
Twin Peaks
Thunder Mtn
Lone Peak
White Baldy
Little Matterhorn
Big Baldy
Loafer Mountain
Rattlesnake Ridge
Box Elder Peak
Mill Canyon Peak
Steep Mtn
Point of the Mtn
Lookout Peak
Quarry Mtn
Richards Flat
Glencoe Mine
Snake Cr
Silver Islet
Pine Canyon
Dry Canyon
Hardy
Lake Desolation
Rattlesnake Ridge
Ranger Station
Camp Williams
Sandy City
Alta
Brighton
Lake Point
Fox Siding
Saltair Siding
Tooele Valley
Oquirrh Mountains
Wasatch Mountains
Uinta Mountains
Salt Lake Co
Utah Co
Tooele Co
Morgan Co
Summit Co



Recreation Opportunity Spectrum

Alternative 5 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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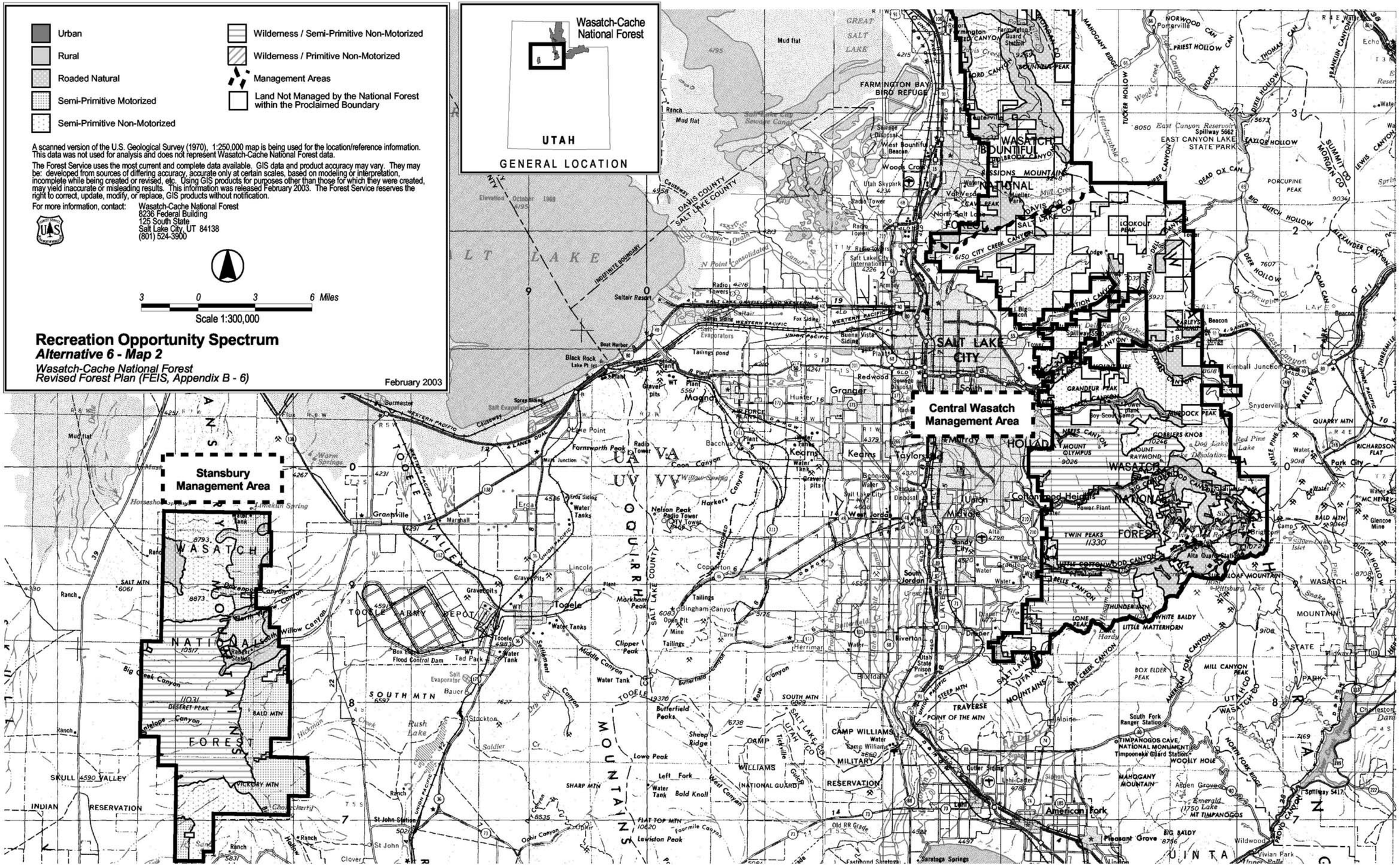
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 6 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
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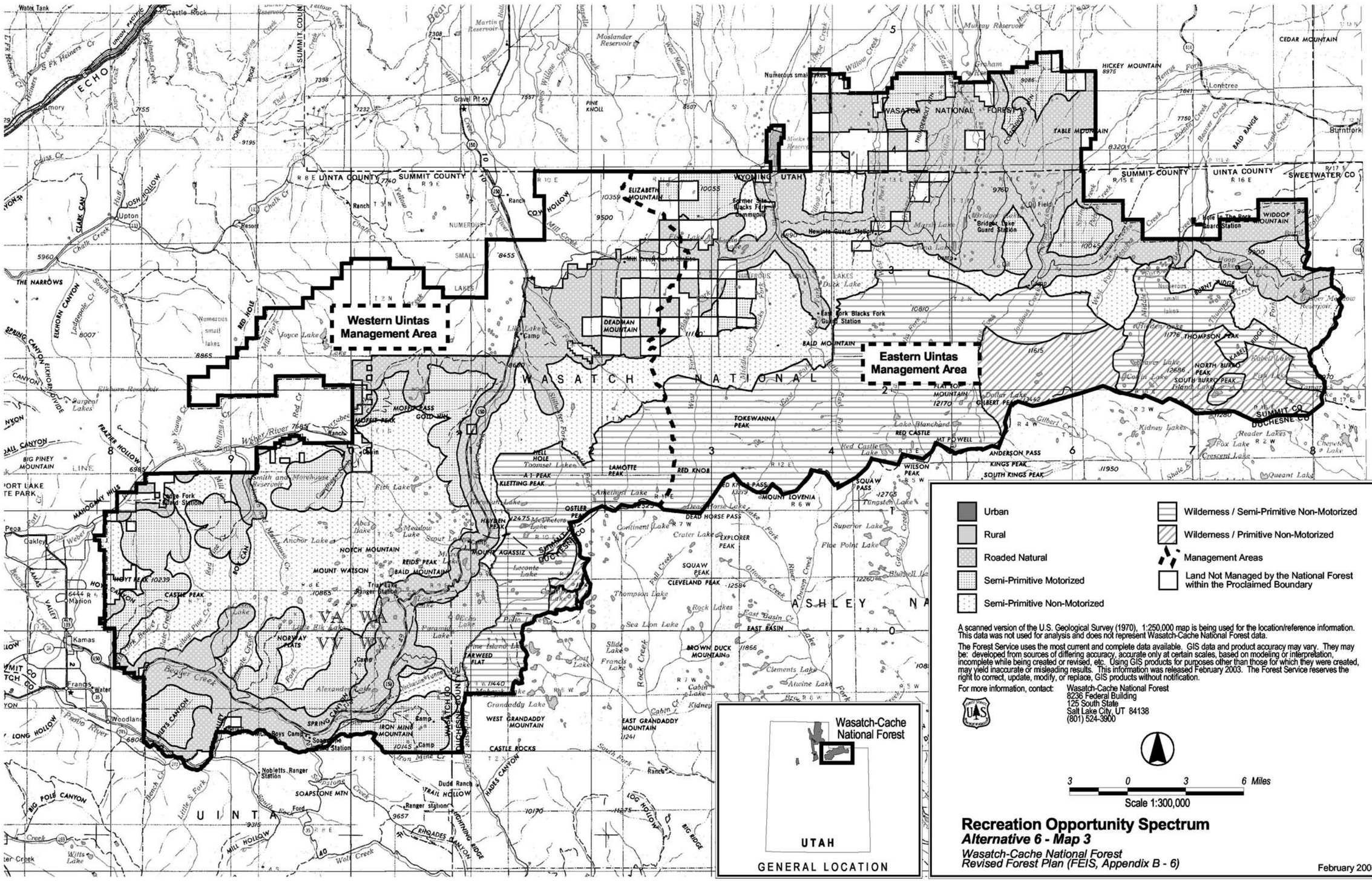
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 6 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
FARMINGTON BAY BIRD REFUGE
GREAT SALT LAKE
EAST CANYON LAKE STATE PARK
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
TIMPANOGOS CAVE NATIONAL MONUMENT
INDIAN RESERVATION
SKULL VALLEY
OQUIRRH MOUNTAINS
TOOELE VALLEY
SOUTH MTN
UTAH LAKE
DAVIS COUNTY
SALT LAKE COUNTY
TOOELE COUNTY
UTAH COUNTY
WASATCH COUNTY
SUMMIT CO
MORGAN CO
UINTA MOUNTAINS


Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SWEETWATER CO
DUCHESNE CO
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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125 South State
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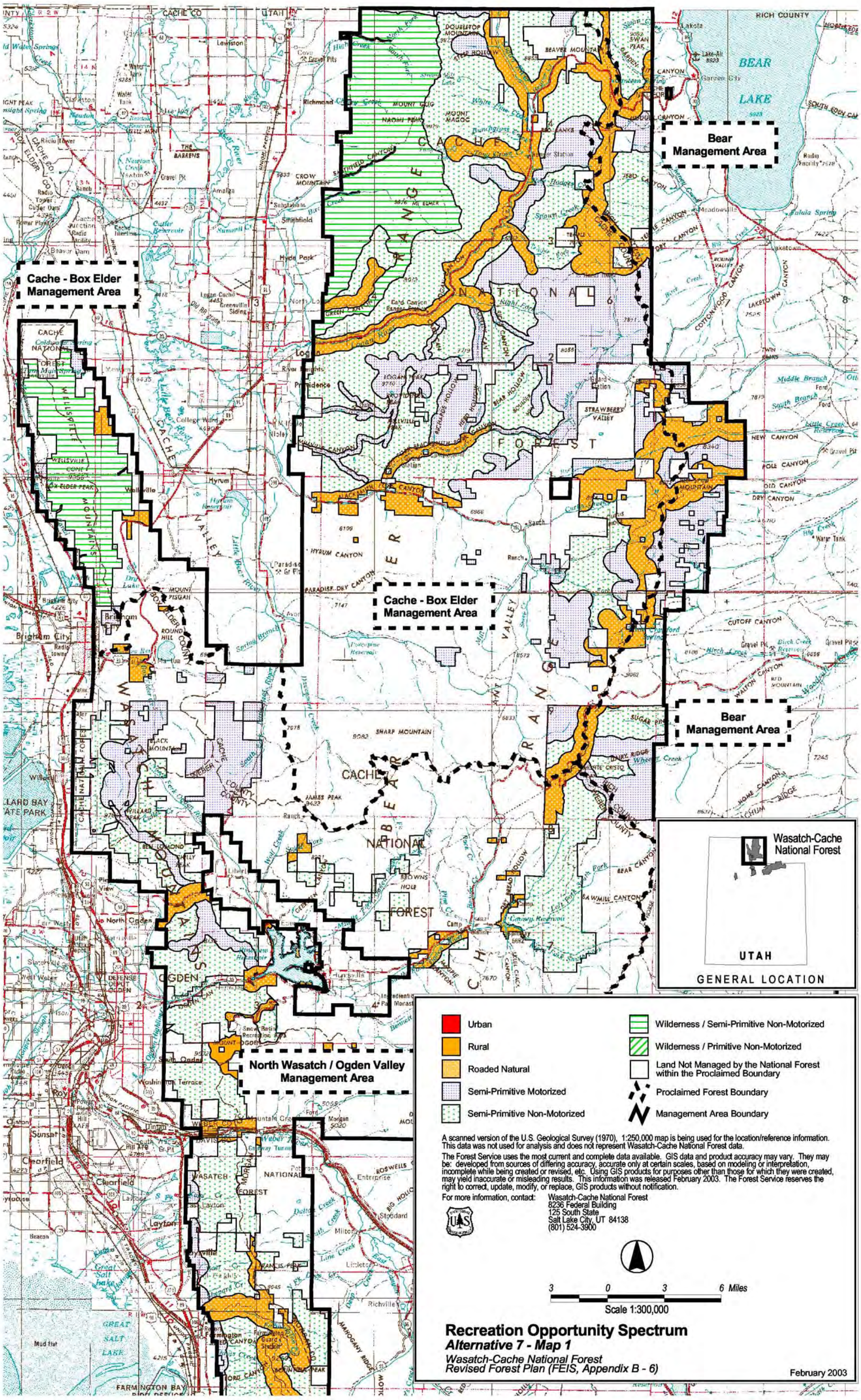
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 6 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Cache - Box Elder Management Area
Bear Management Area
Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Land Not Managed by the National Forest within the Proclaimed Boundary
Proclaimed Forest Boundary
Management Area Boundary
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Scale 1:300,000
Recreation Opportunity Spectrum
Alternative 7 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003

- Urban
- Rural
- Roaded Natural
- Semi-Primitive Motorized
- Semi-Primitive Non-Motorized
- Wilderness / Semi-Primitive Non-Motorized
- Wilderness / Primitive Non-Motorized
- Land Not Managed by the National Forest within the Proclaimed Boundary
- Proclaimed Forest Boundary
- Management Area Boundary

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3 0 3 6 Miles

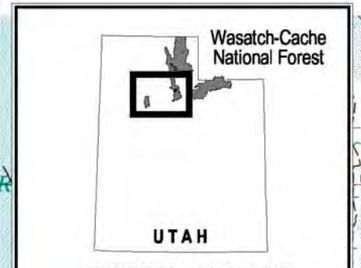
Scale 1:300,000

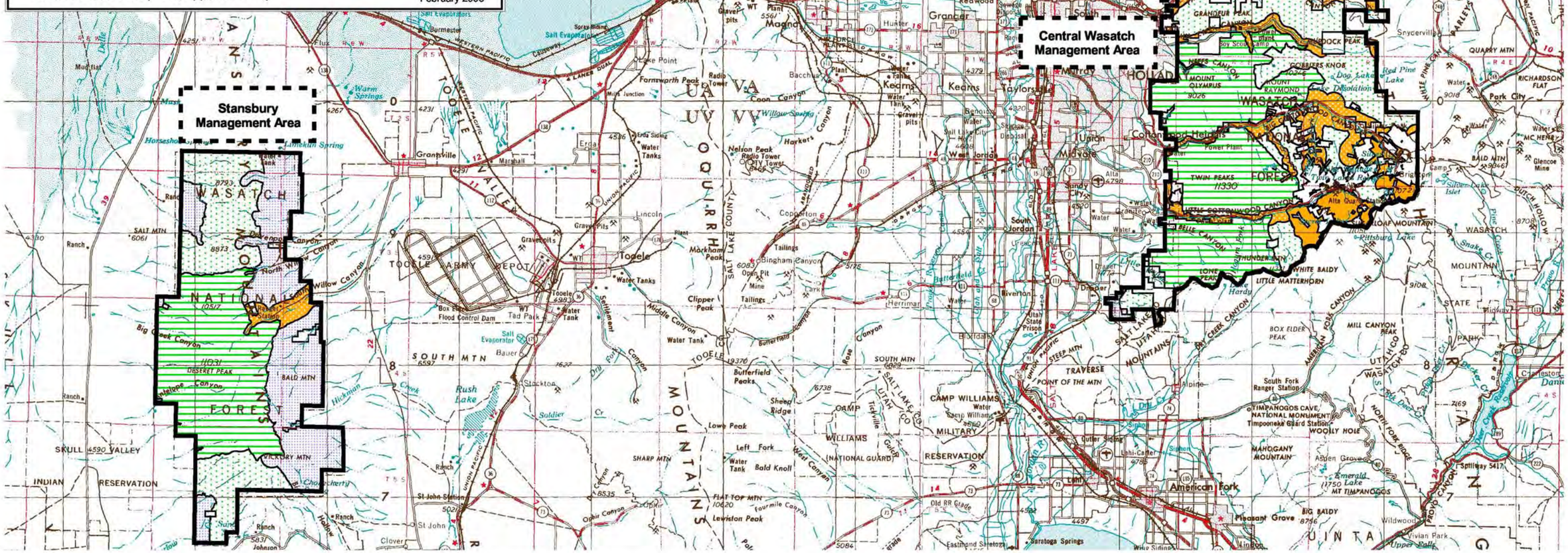
Recreation Opportunity Spectrum

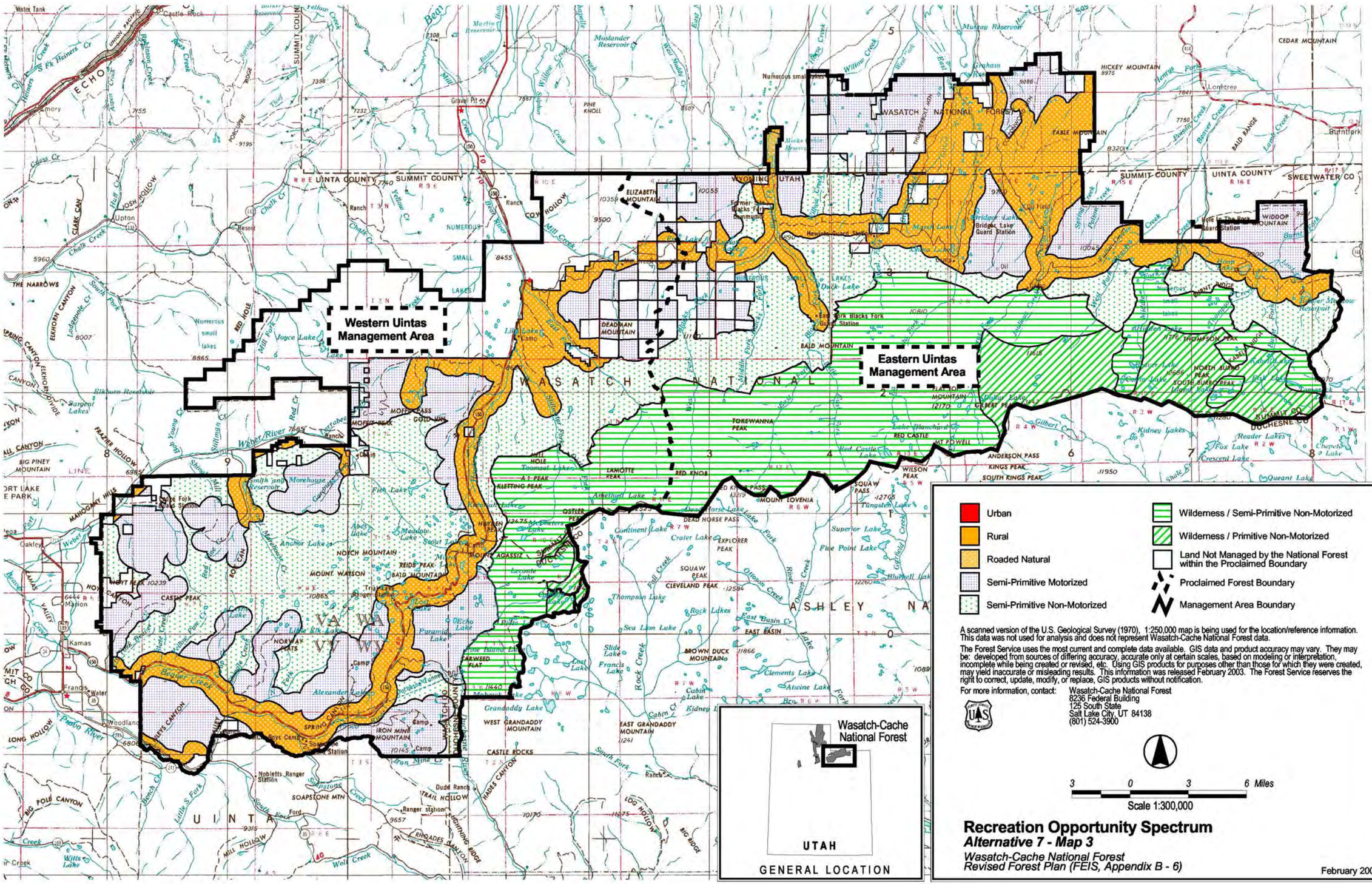
Alternative 7 - Map 2

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003

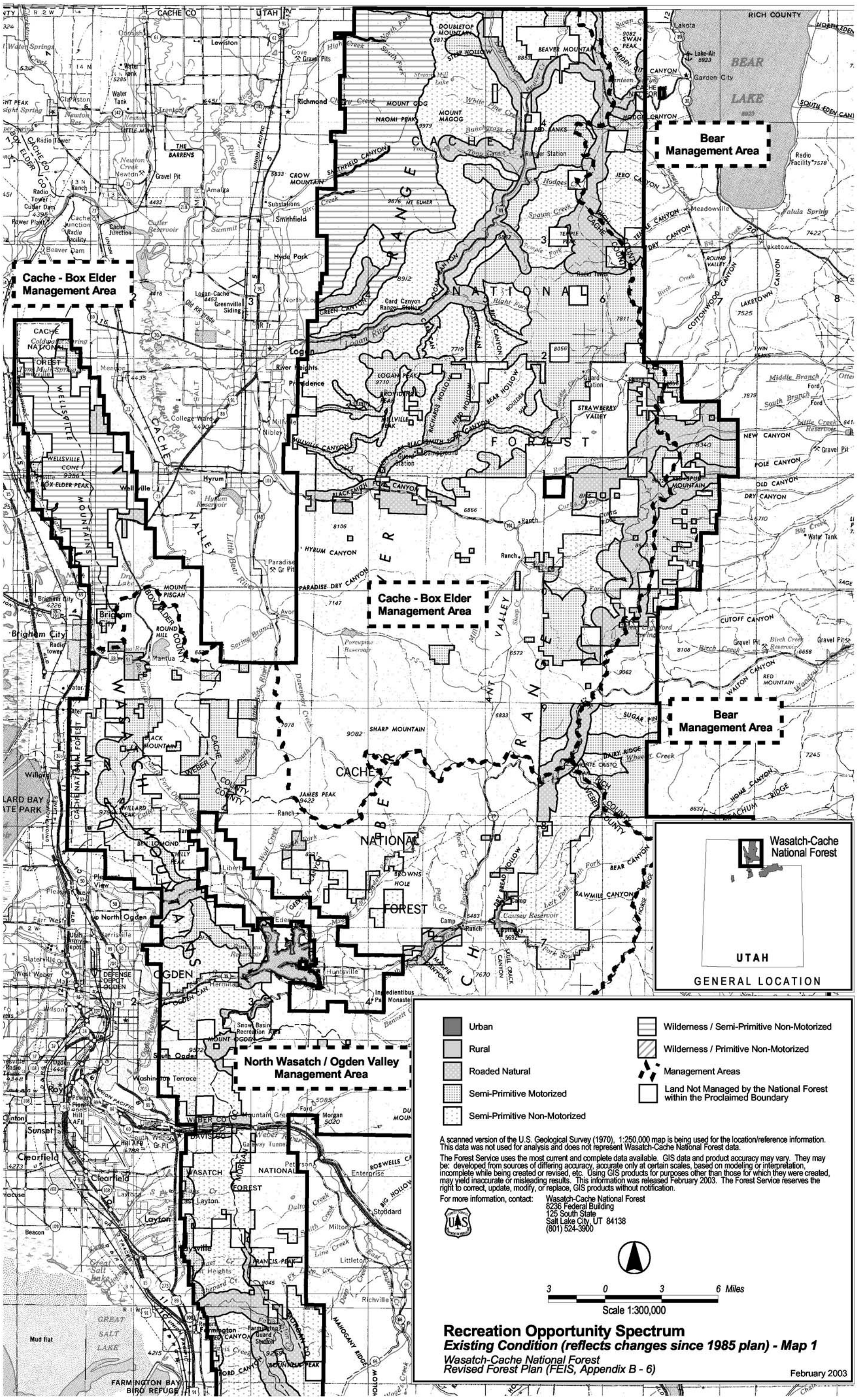






Recreation Opportunity Spectrum
Alternative 7 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
Management Areas
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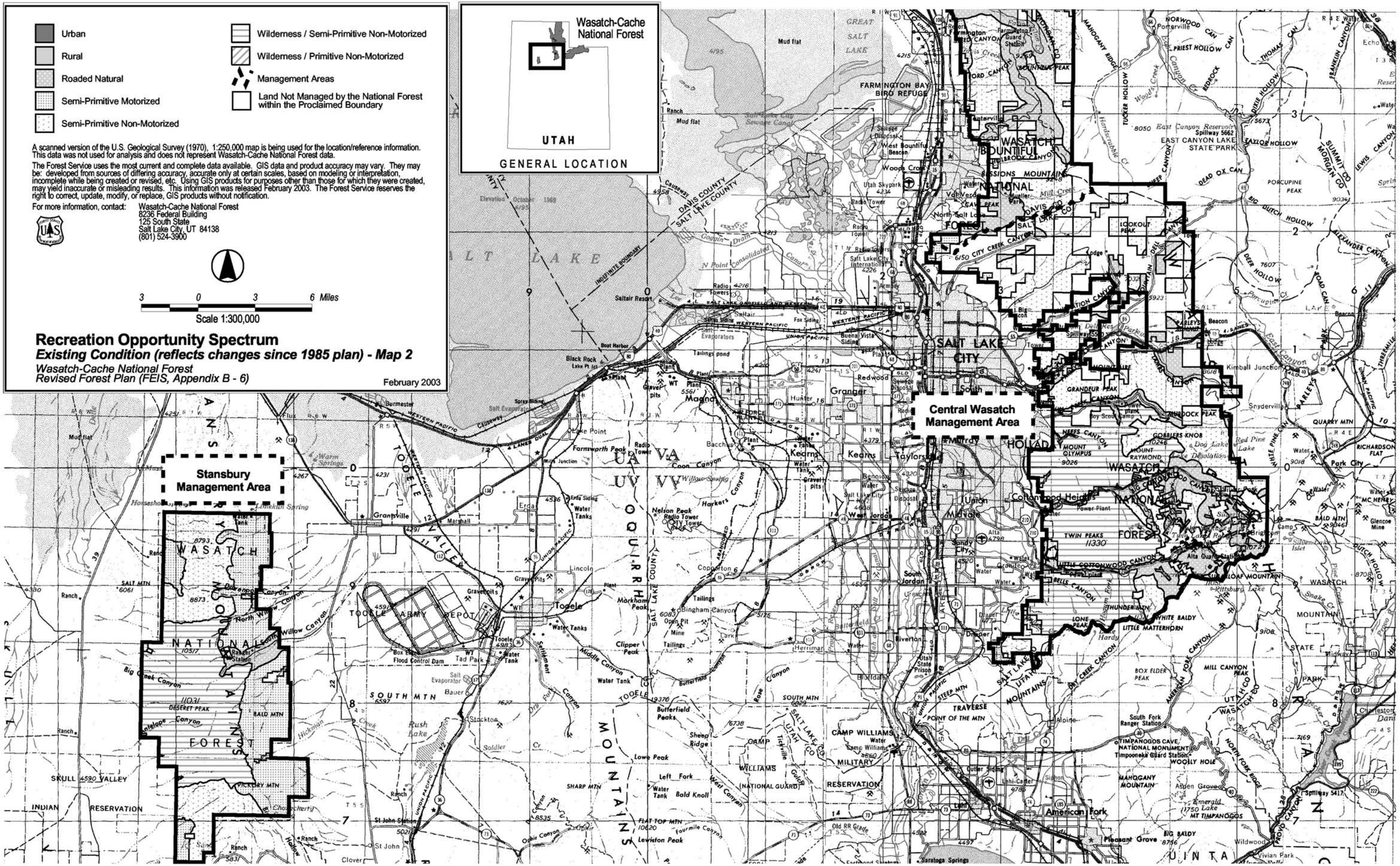
Scale 1:300,000
Recreation Opportunity Spectrum
Existing Condition (reflects changes since 1985 plan) - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003


Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Wilderness / Semi-Primitive Non-Motorized
Wilderness / Primitive Non-Motorized
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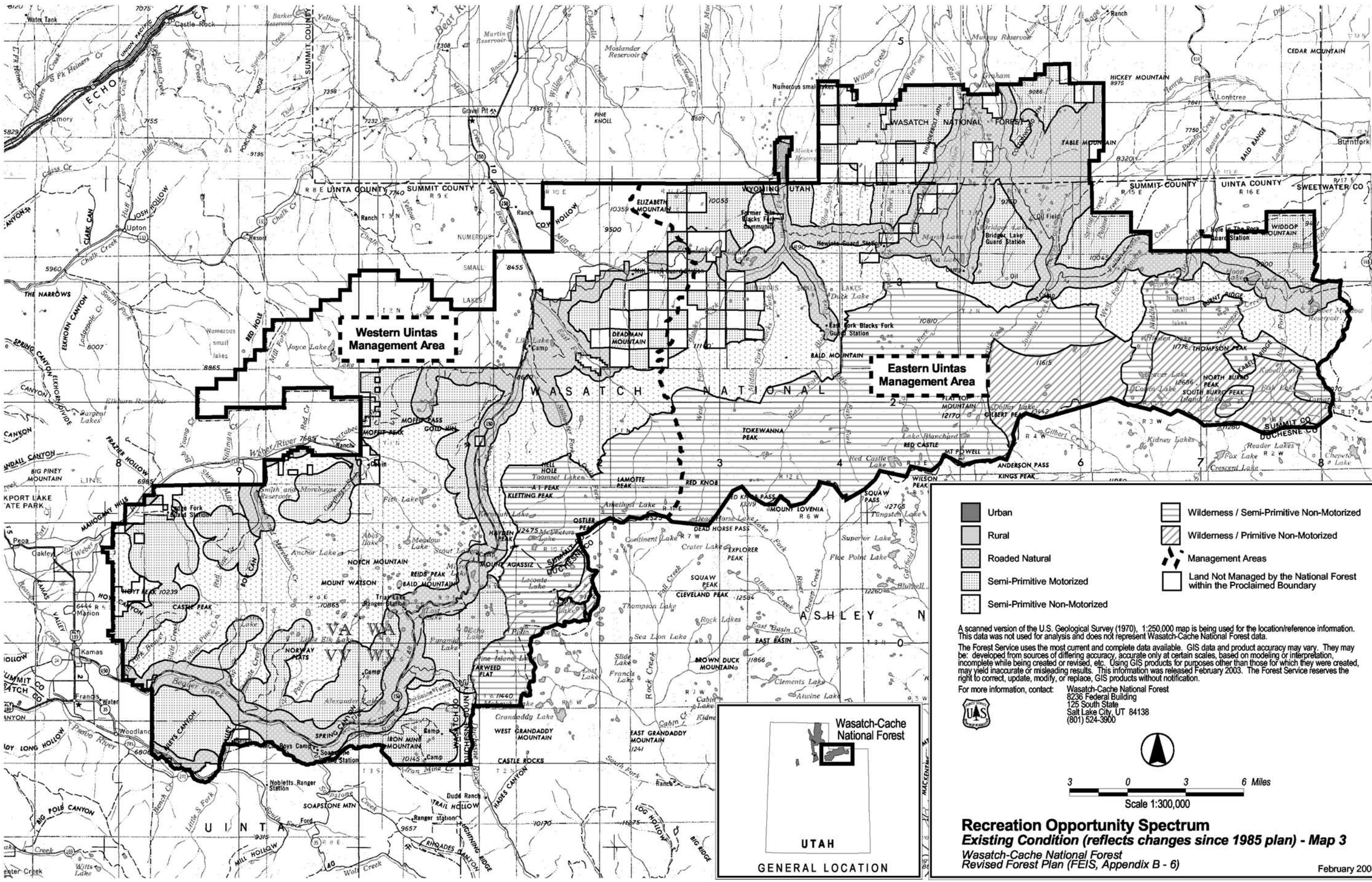
Recreation Opportunity Spectrum
Existing Condition (reflects changes since 1985 plan) - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
WASATCH BOUNTIFUL
FARMINGTON BAY BIRD REFUGE
GREAT SALT LAKE
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
UINTA MOUNTAINS
OQUIRRH MOUNTAINS
TOOELE VALLEY
SALT LAKE VALLEY
INDIAN RESERVATION
SKULL VALLEY
DAVIS COUNTY
SALT LAKE COUNTY
TOOELE COUNTY
UTAH COUNTY
WASATCH COUNTY
SUMMIT CO
MORGAN CO
EAST CANYON LAKE STATE PARK
EAST CANYON RESERVOIR
Saltair Resort
Black Rock
Lake Pt Jct
Boat Harbor
Farmington
Bountiful
Woods Cross
Kaysville
Layton
Clearfield
Sunset
Roy
Hooper
Magna
Granger
Hunter
Kearns
Taylorsville
West Jordan
Sandy
Draper
Riverton
Bluffdale
Lehi
American Fork
Pleasant Grove
Orem
Provo
Park City
Kimball Junction
Snyderville
Coalville
Morgan
Tooele
Grantsville
Stockton
Bauer
Erda
Lake Point
Farnsworth Peak
Nelson Peak
Markham Peak
Clipper Peak
Bingham Canyon
Butterfield Peaks
Lewiston Peak
Flat Top Mtn
Deseret Peak
Bald Mtn
Vickery Mtn
Salt Mtn
Lookout Peak
Grandeur Peak
Twin Peaks
Thunder Mtn
Lone Peak
Timpanogos Cave National Monument
Mount Timpanogos
Mount Olympus
Mount Raymond
Porcupine Peak
Quarry Mtn
Richardson Flat
Bald Mtn
Glencoe Mine
Box Elder Peak
Mahogany Mountain
Aspen Grove
Emerald Lake
Big Baldy
Traverse Mtn
Point of the Mtn
Camp Williams
Saltair
Fox Siding
Buena Vista Siding
Tailings pond
Salt Evaporators
Spray Siding
Burmester
Flux
Lincoln
Gravel pits
Water Tanks
Tad Park
Ranger Station
Box Elder Flood Control Dam
Middle Canyon
Willow Canyon
Big Creek Canyon
Antelope Canyon
Hickman
Soldier Cr
Rush Lake
Sheep Ridge
Lowe Peak
Left Fork
Bald Knoll
Sharp Mtn
Fourmile Canyon
Ophir Canyon
Clover
St John
Saratoga Springs
Wildwood
Vivian Park
Provo Canyon
Spillway 5417
Alpine
Draper
Utah State Prison
Cottonwood Heights
Alta
Brighton
Silver Lake
Little Cottonwood Canyon
Big Cottonwood Canyon
Mill Creek
Parleys Canyon
Emigration Canyon
Red Pine Lake
Dog Lake
Lake Desolation
Pittsburg Lake
Snake Cr
Dry Creek Canyon
American Fork Canyon
Mill Canyon Peak
Nebo Loop
Nephi Fork Ridge
Woolly Hole
Charleston Dam
Deer Creek Dam
Salt Lake City Sewage Canal
Mud flat
Ranch
Elevation October 1969

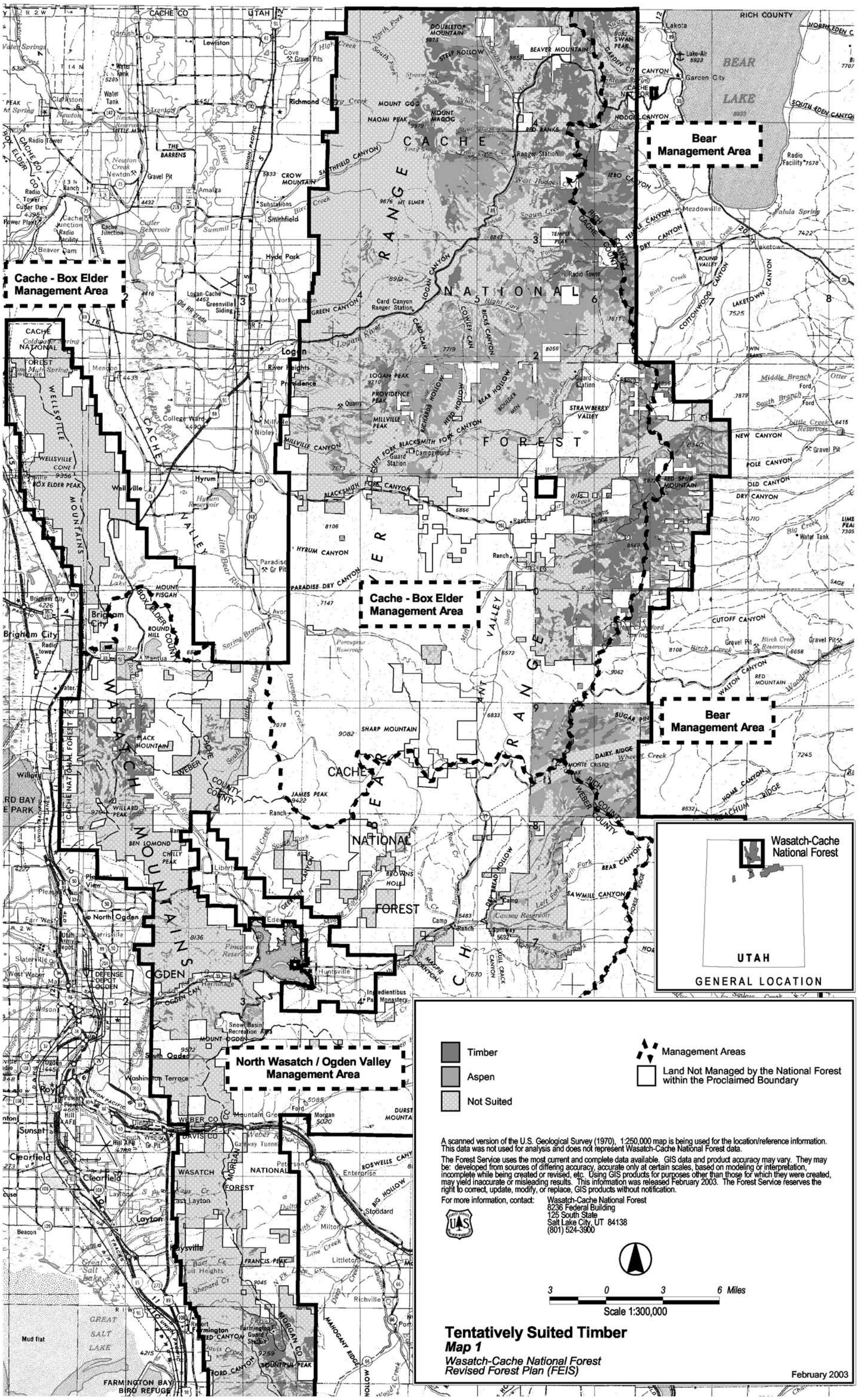


Recreation Opportunity Spectrum

Existing Condition (reflects changes since 1985 plan) - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Timber
Aspen
Not Suited
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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3 0 3 6 Miles
Scale 1:300,000
Tentatively Suited Timber
Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003

Timber

Aspen

Not Suited

Management Areas

Land Not Managed by the National Forest within the Proclaimed Boundary

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3 0 3 6 Miles

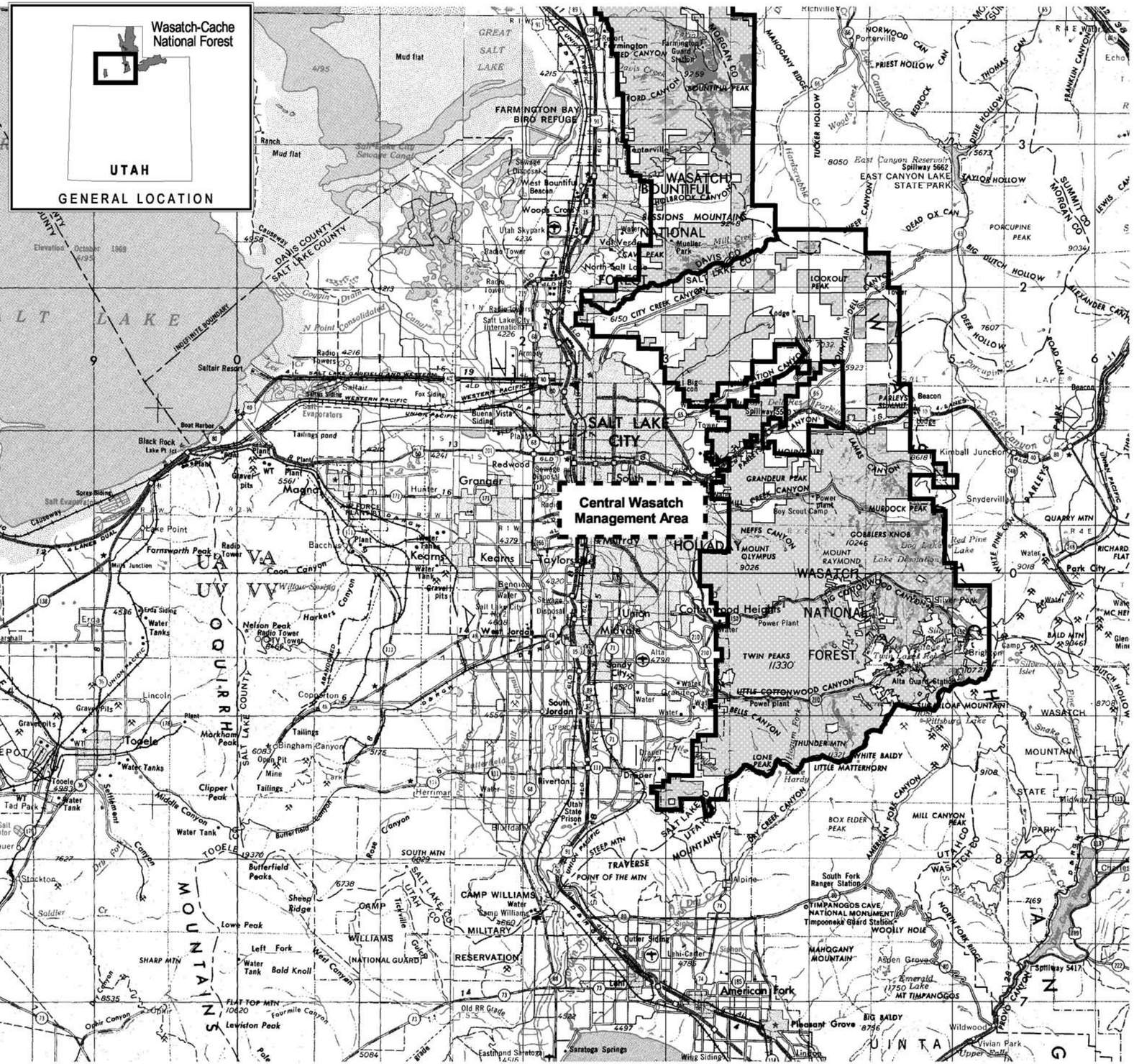
Scale 1:300,000

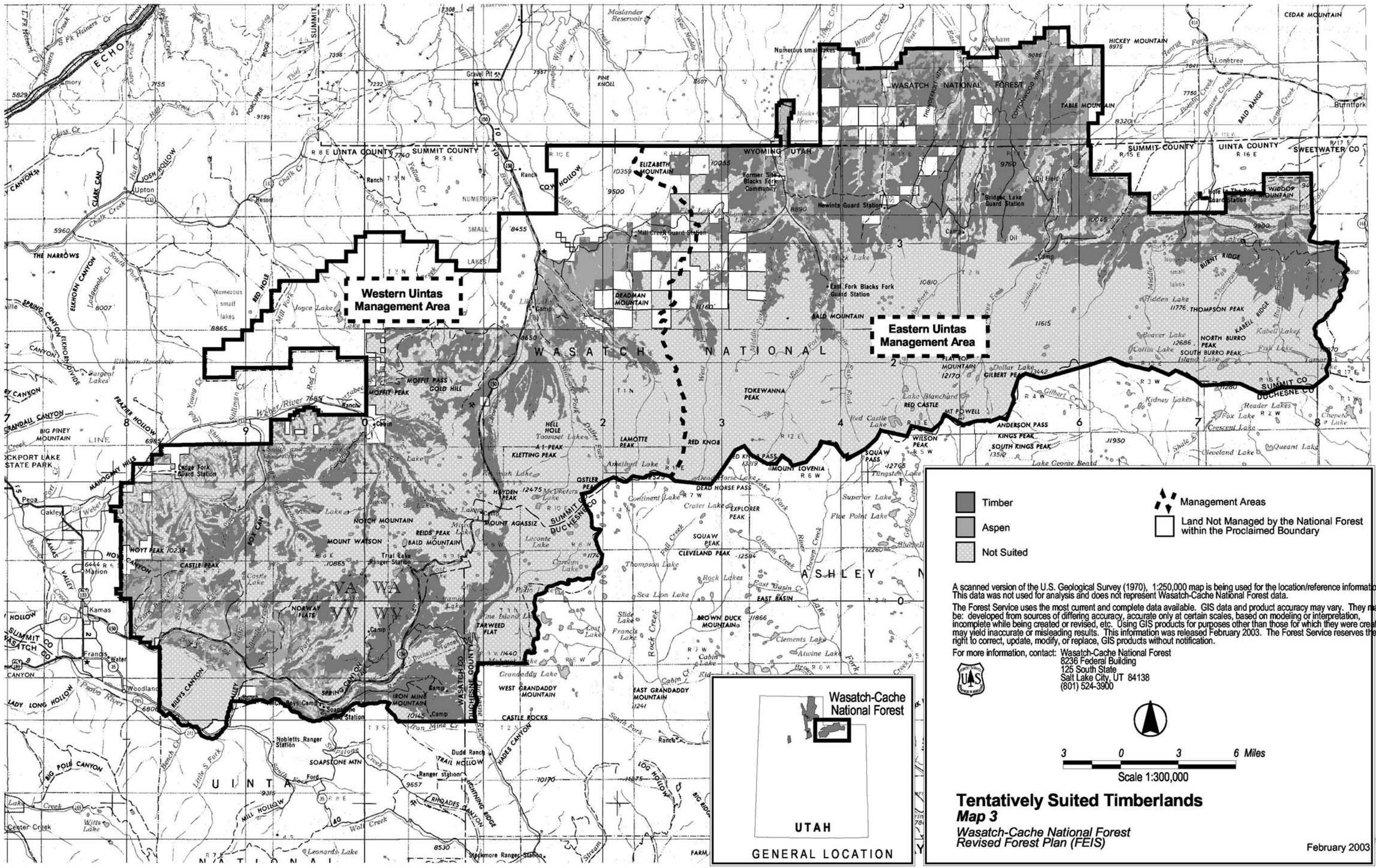
Tentatively Suited Timber

Map 2

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003





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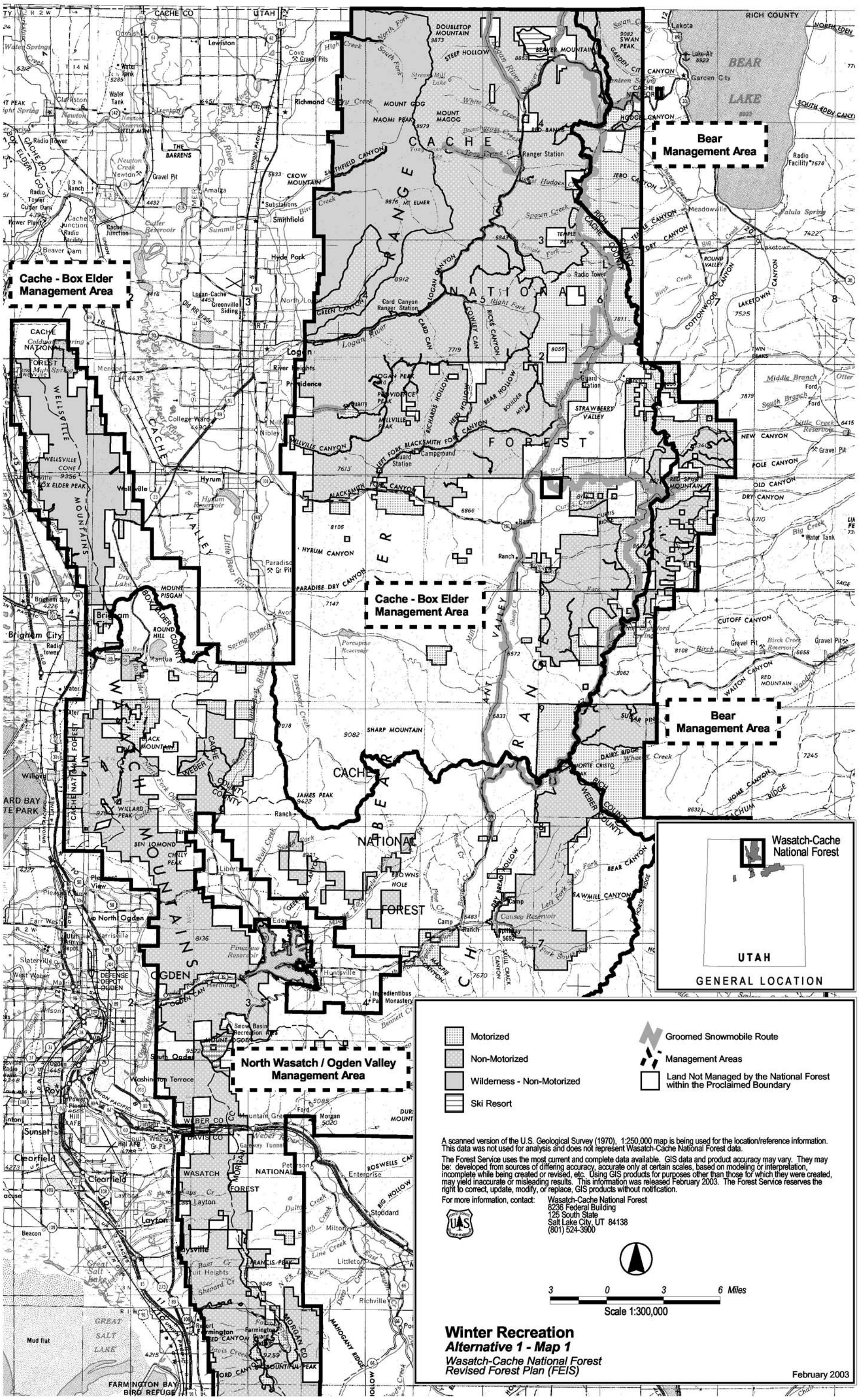
Tentatively Suited Timberlands

Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Groomed Snowmobile Route
Management Areas
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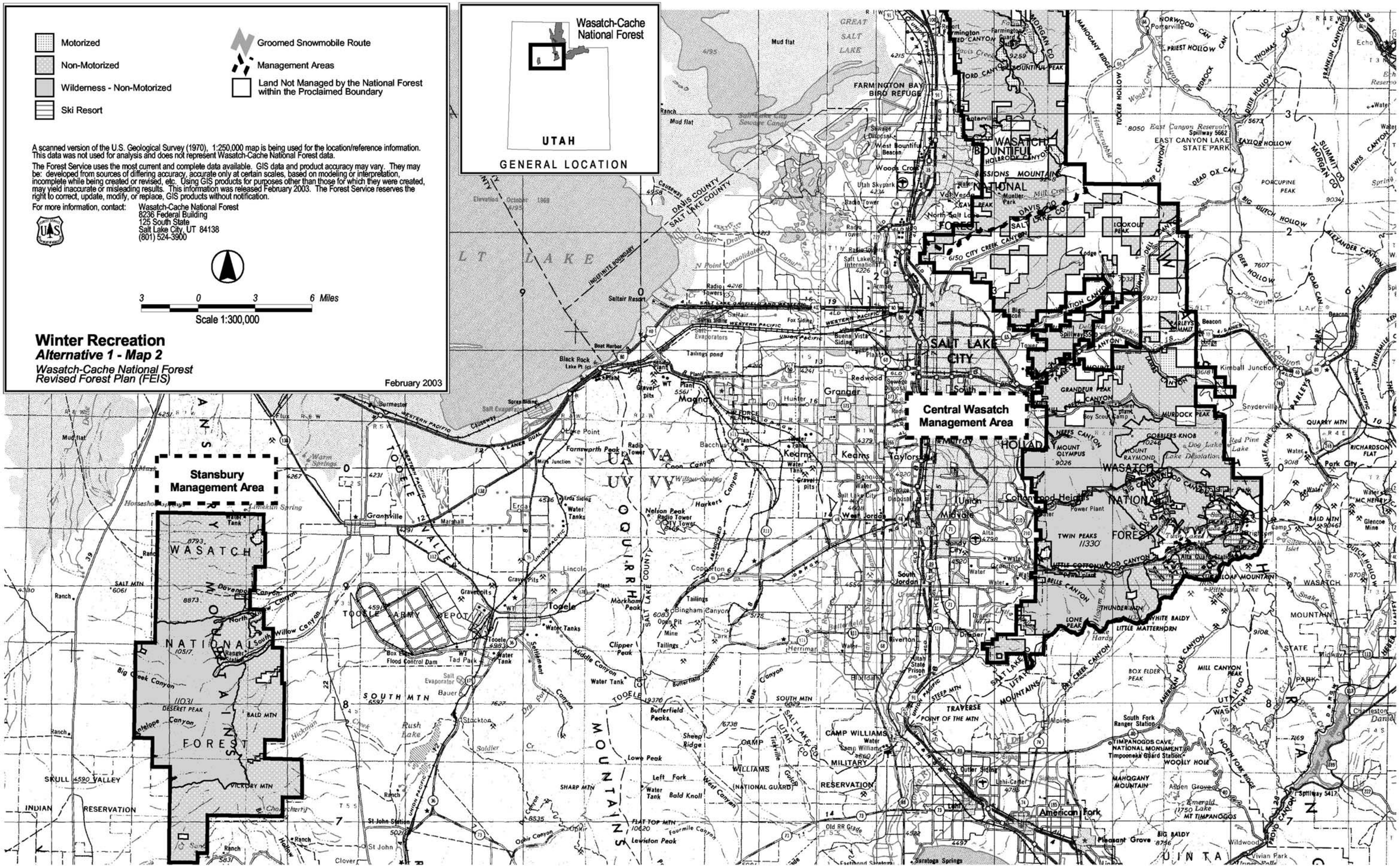
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 1 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Motorized
Non-Motorized
Wilderness - Non-Motorized
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Winter Recreation
Alternative 1 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
FARMINGTON BAY BIRD REFUGE
GREAT SALT LAKE
TOOELE ARMY DEPOT
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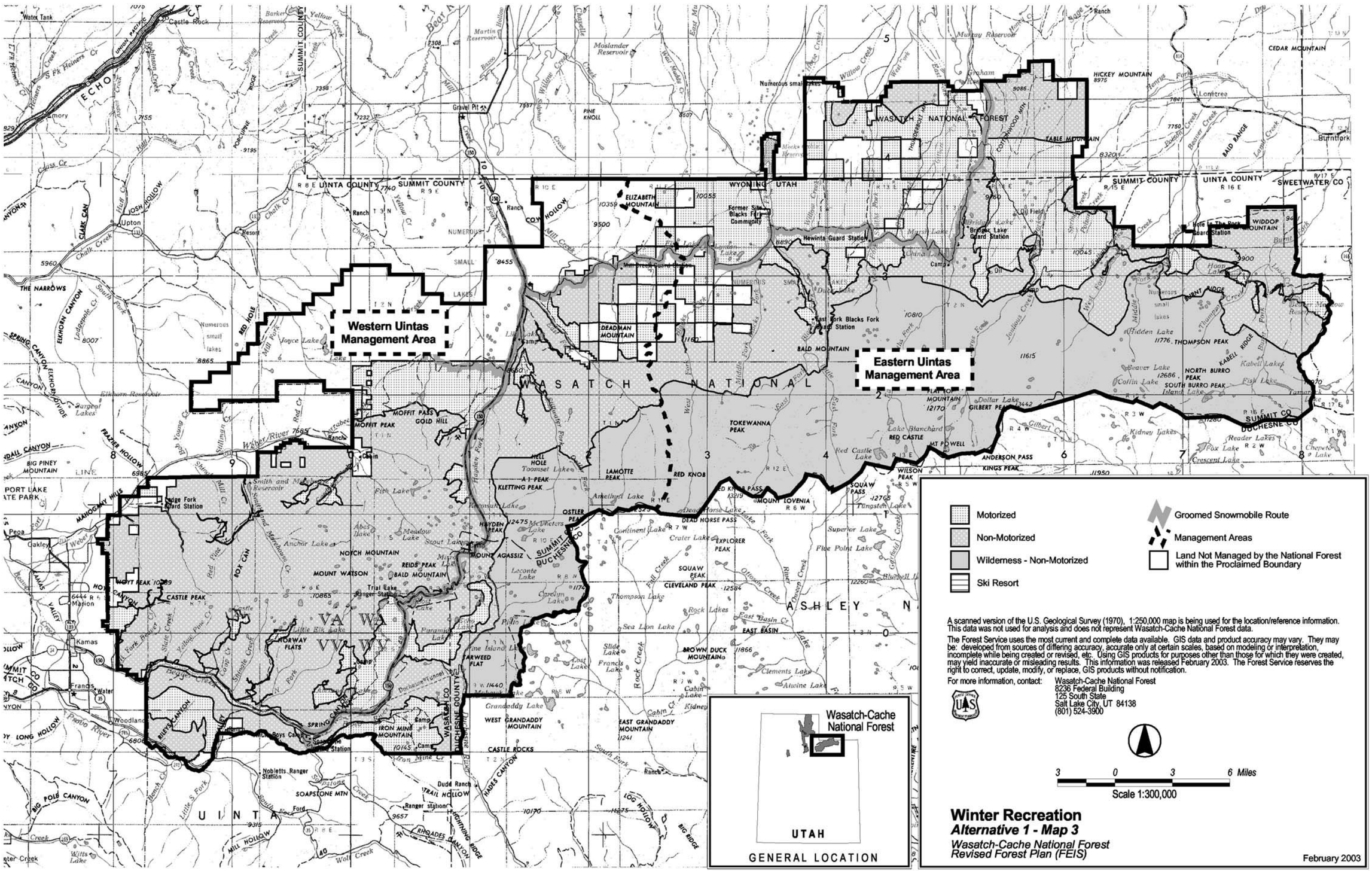
OQUIRRH MOUNTAINS
TOOELE VALLEY
SALT LAKE VALLEY
EAST CANYON LAKE STATE PARK
TIMPANOGOS CAVE NATIONAL MONUMENT


Western Uintas Management Area
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WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SUMMIT CO
DUCHESNE CO
SWEETWATER CO
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Groomed Snowmobile Route
Management Areas
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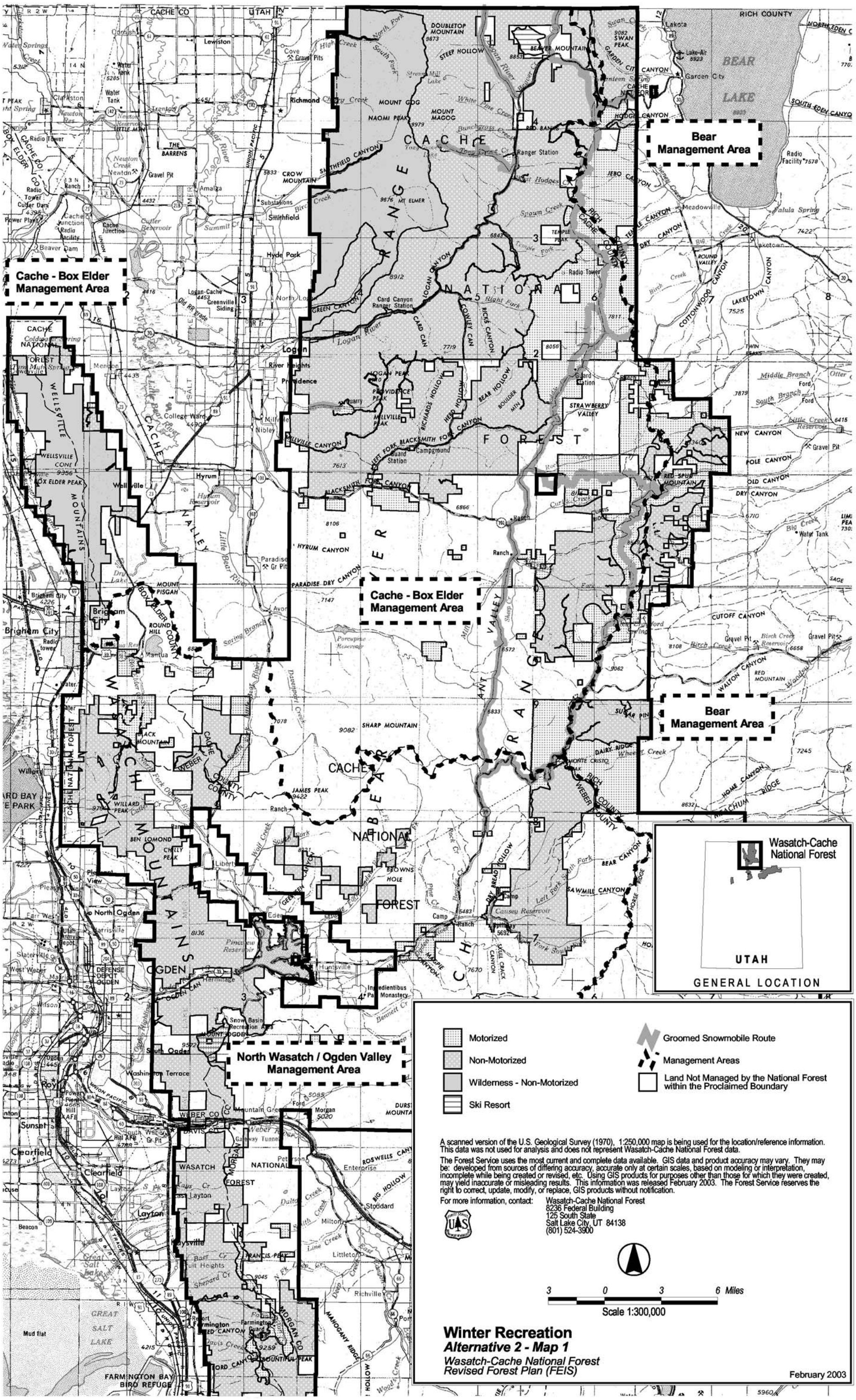
Winter Recreation
Alternative 1 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Bear Management Area
Cache - Box Elder Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Groomed Snowmobile Route
Management Areas
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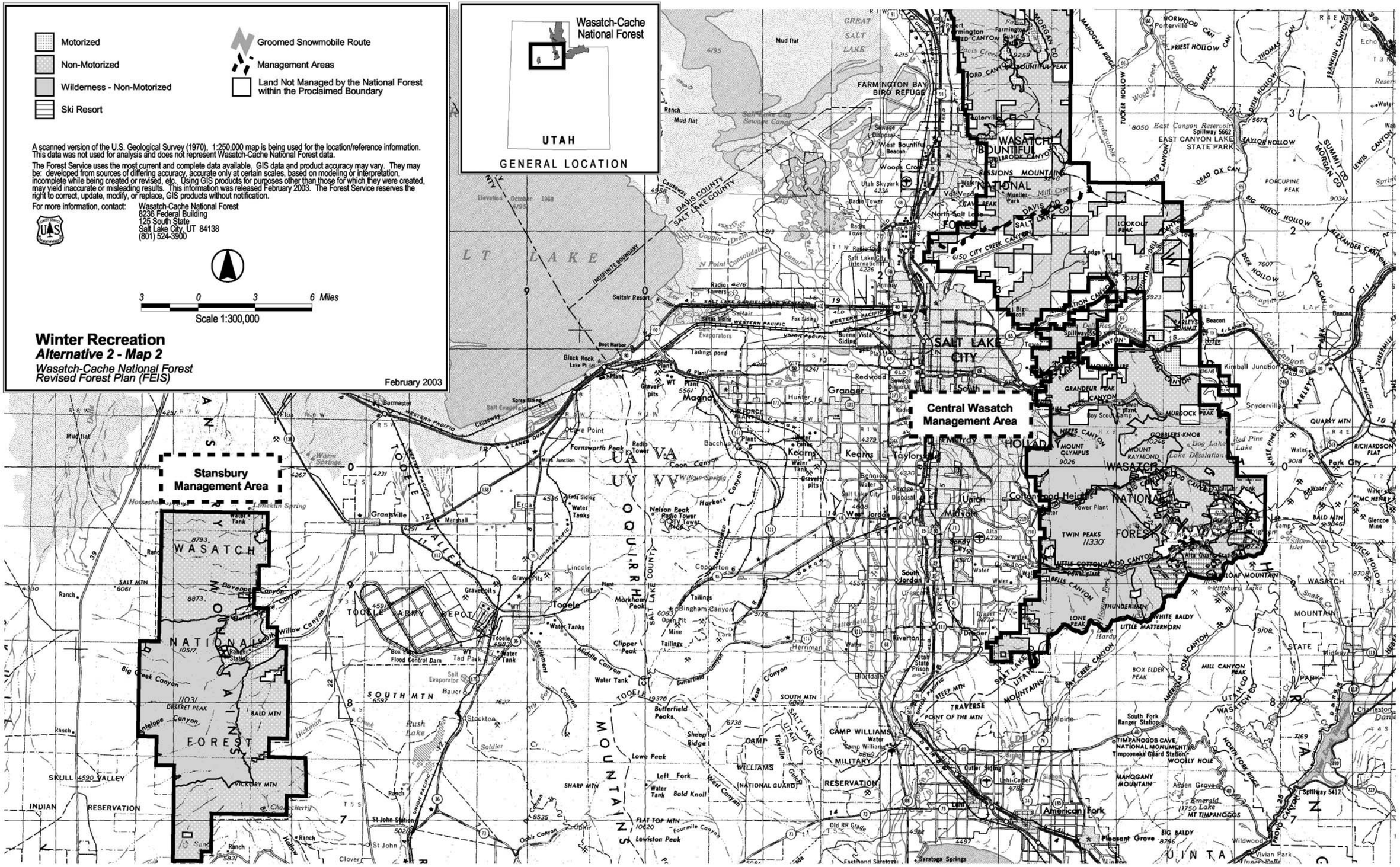
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 2 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003



- ▒ Motorized
- ▒ Non-Motorized
- ▨ Wilderness - Non-Motorized
- ☰ Ski Resort
- Groomed Snowmobile Route
- Management Areas
- ☐ Land Not Managed by the National Forest within the Proclaimed Boundary

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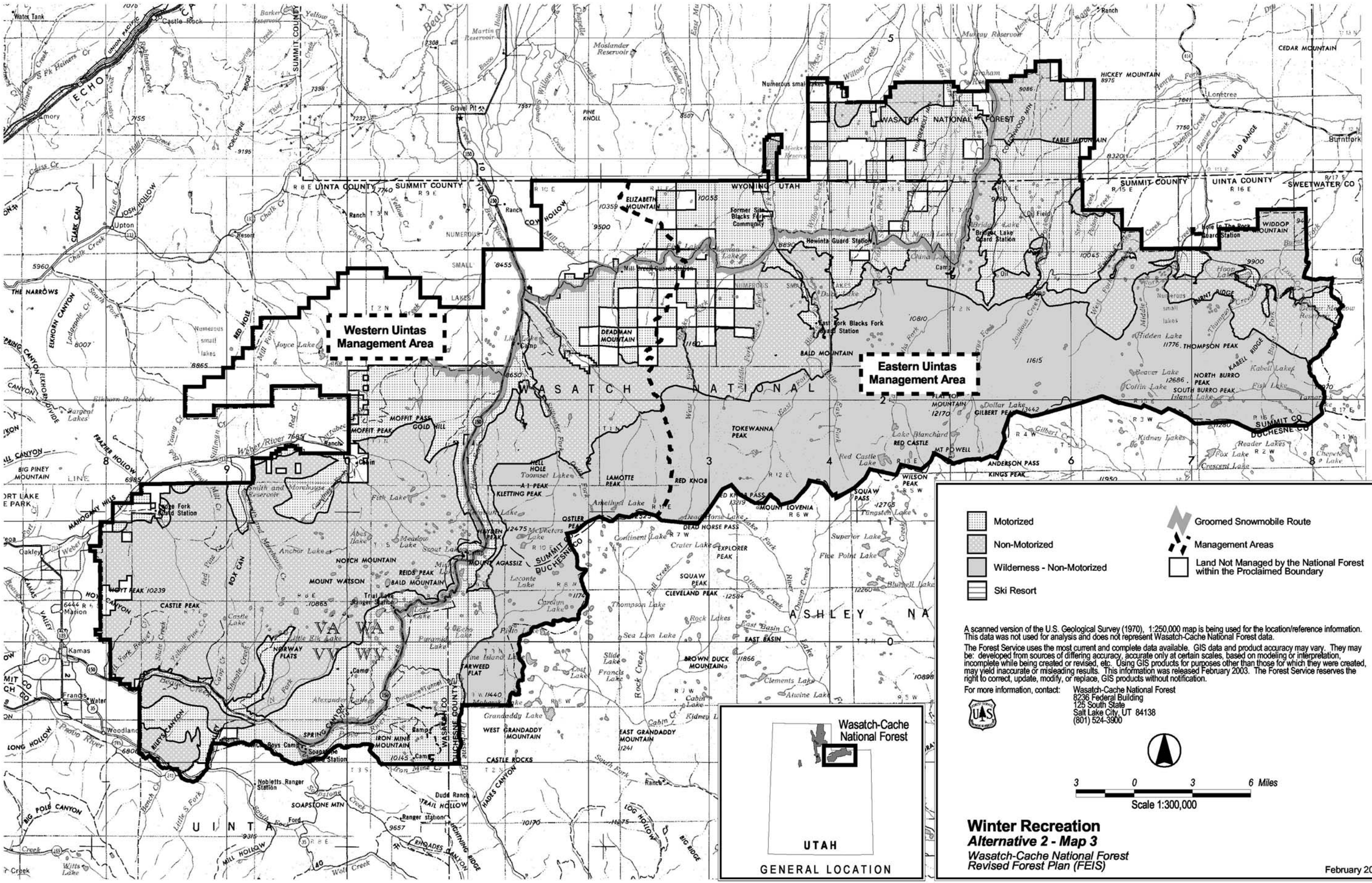
3 0 3 6 Miles
Scale 1:300,000

Winter Recreation
Alternative 2 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003



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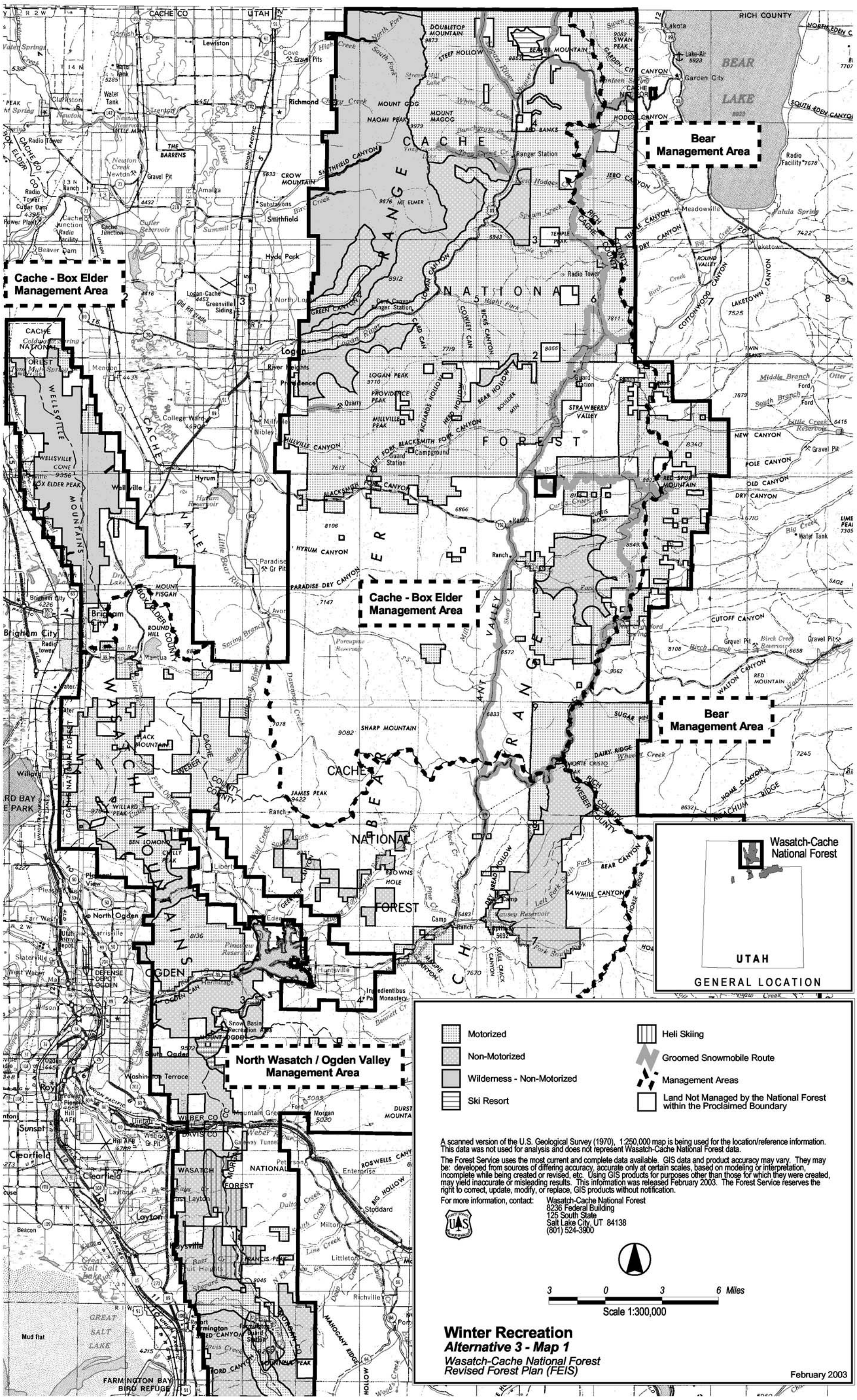
For more information, contact: Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3900

Winter Recreation

Alternative 2 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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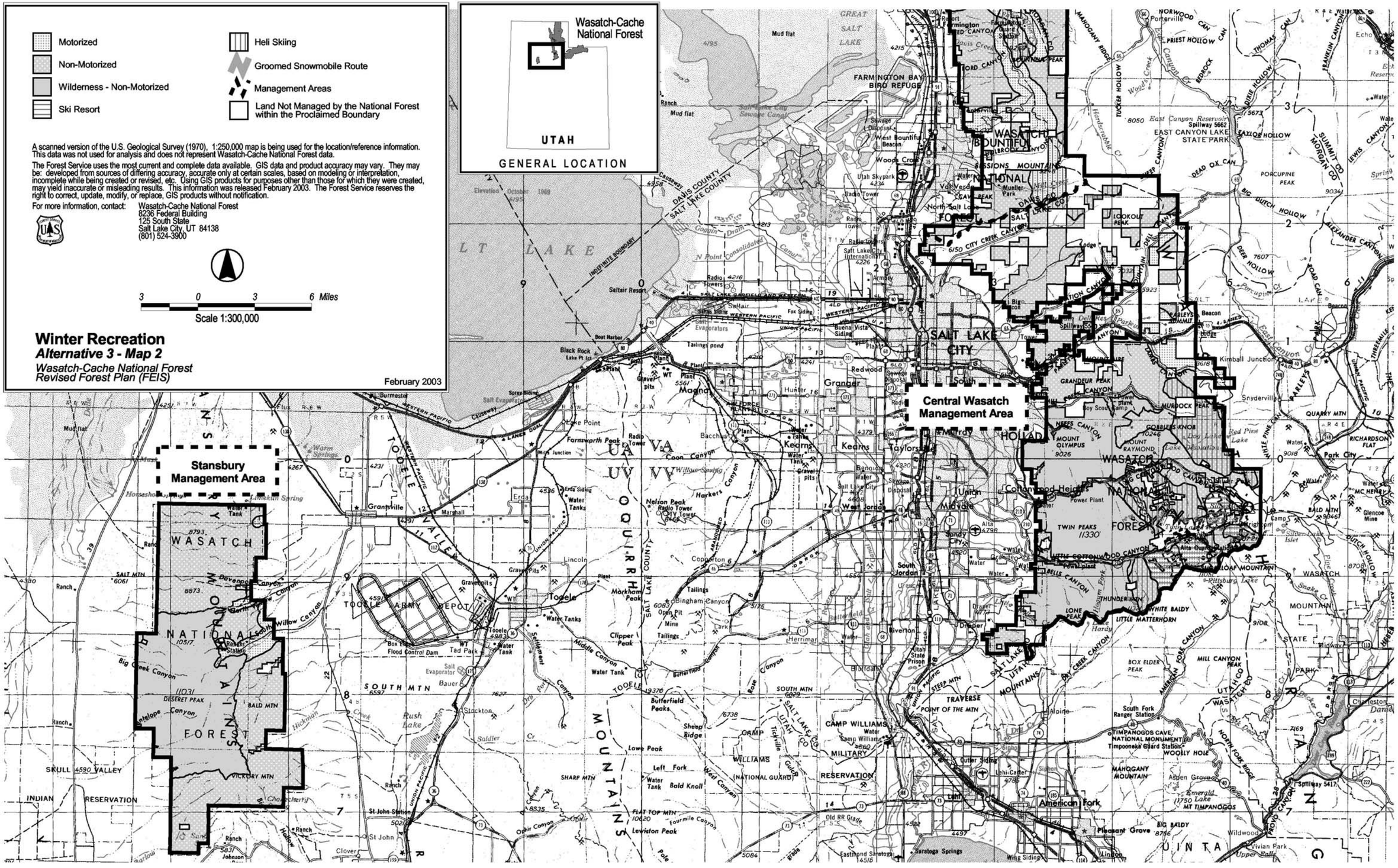
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 3 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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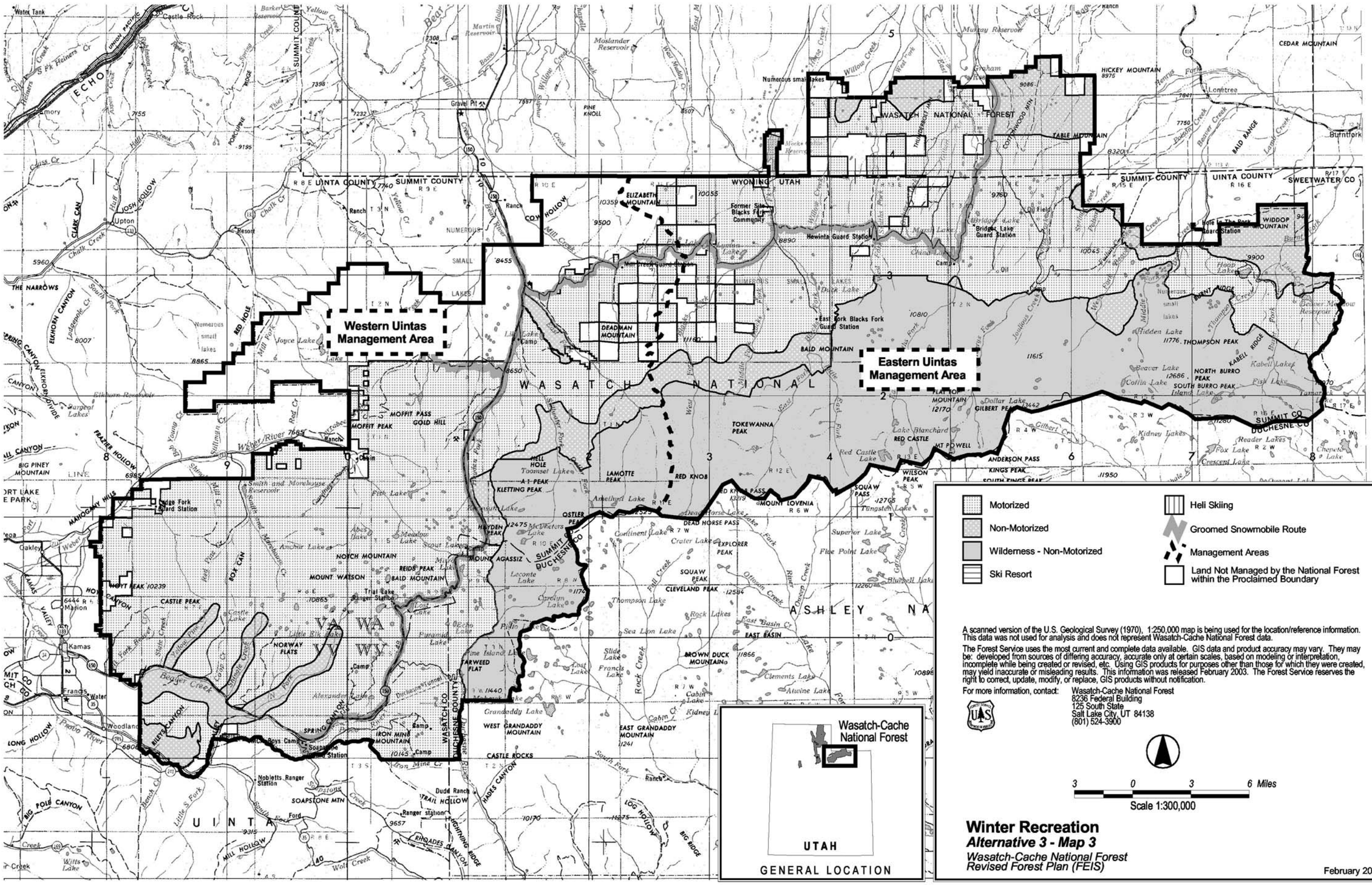
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 3 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
WASATCH BOUNDFUL
FARMINGTON BAY BIRD REFUGE
EAST CANYON LAKE STATE PARK
TOOELE ARMY DEPOT
OQUIRRH MOUNTAINS
SOUTH MTN
CAMP WILLIAMS MILITARY RESERVATION
TIMPANOGOS CAVE NATIONAL MONUMENT
UINTA NATIONAL FOREST
SKULL VALLEY INDIAN RESERVATION
GREAT SALT LAKE



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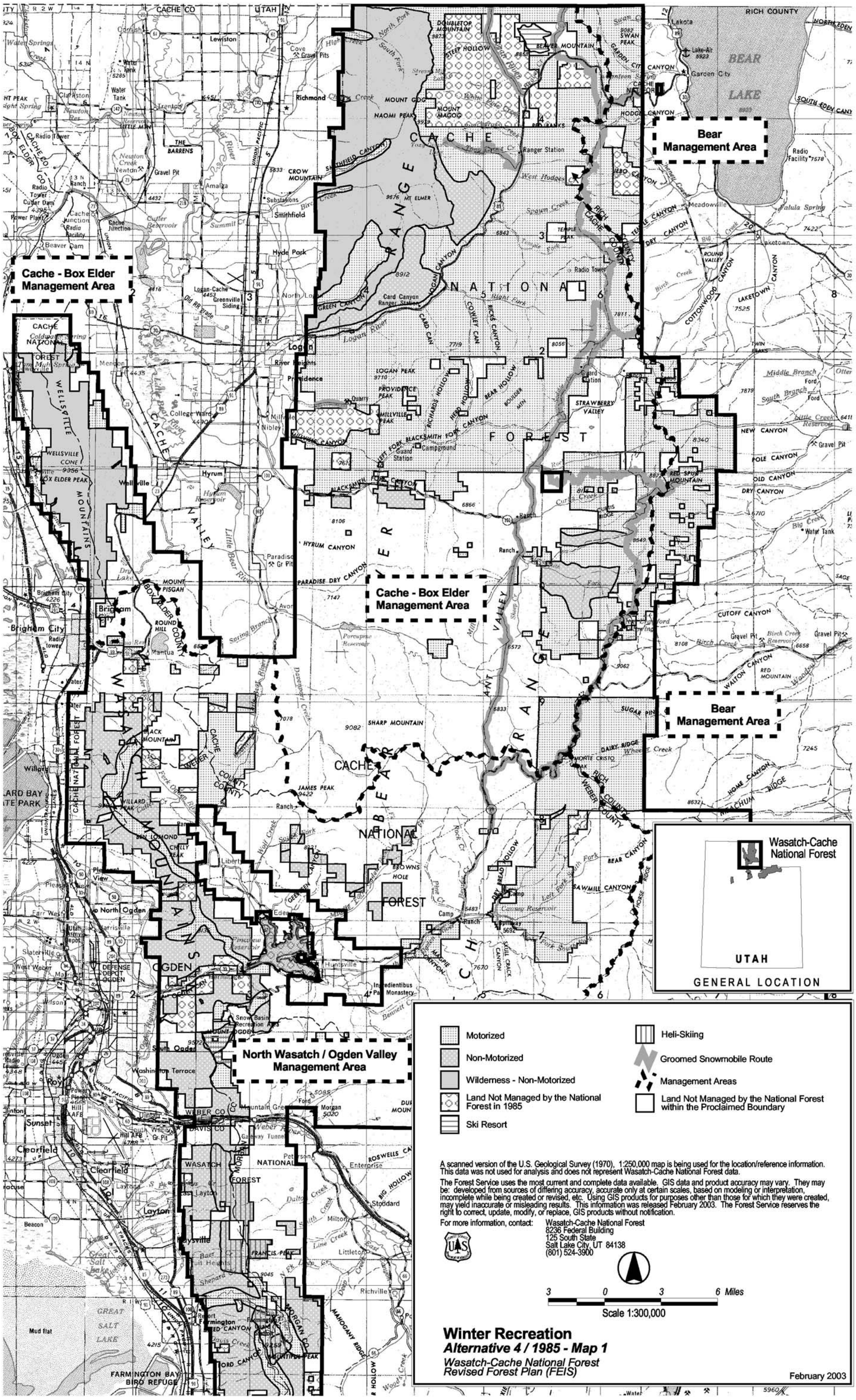
Winter Recreation

Alternative 3 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Land Not Managed by the National Forest in 1985
Ski Resort
Heli-Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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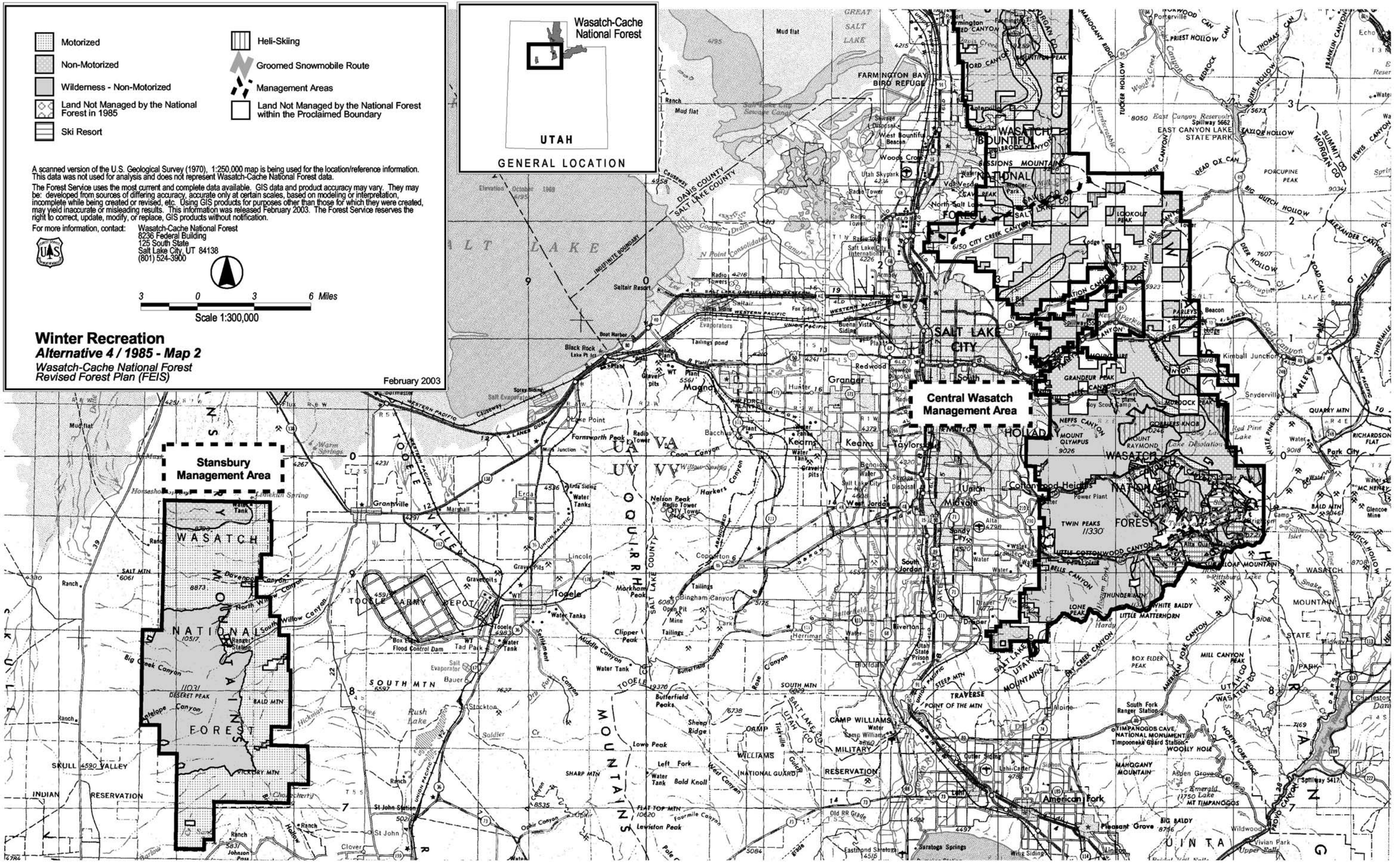
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 4 / 1985 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Motorized
Non-Motorized
Wilderness - Non-Motorized
Land Not Managed by the National Forest in 1985
Ski Resort
Heli-Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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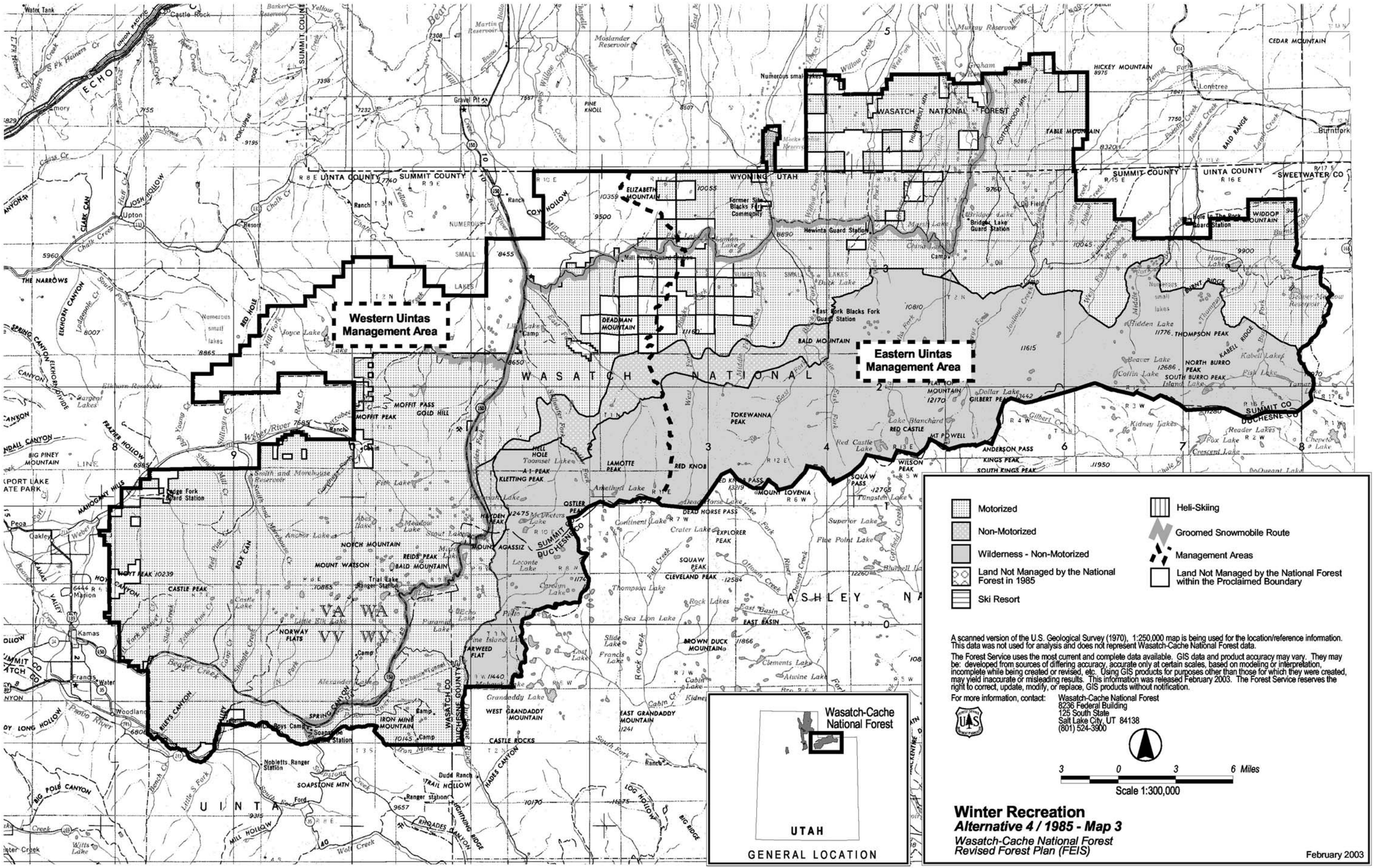
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 4 / 1985 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Stansbury Management Area
Central Wasatch Management Area
WASATCH NATIONAL FOREST
FARMINGTON BAY BIRD REFUGE
SALT LAKE CITY
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
UINTA NATIONAL FOREST



Motorized

Non-Motorized

Wilderness - Non-Motorized

Land Not Managed by the National Forest in 1985

Ski Resort

Heli-Skiing

Groomed Snowmobile Route

Management Areas

Land Not Managed by the National Forest within the Proclaimed Boundary

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(801) 524-3900

3 0 3 6 Miles

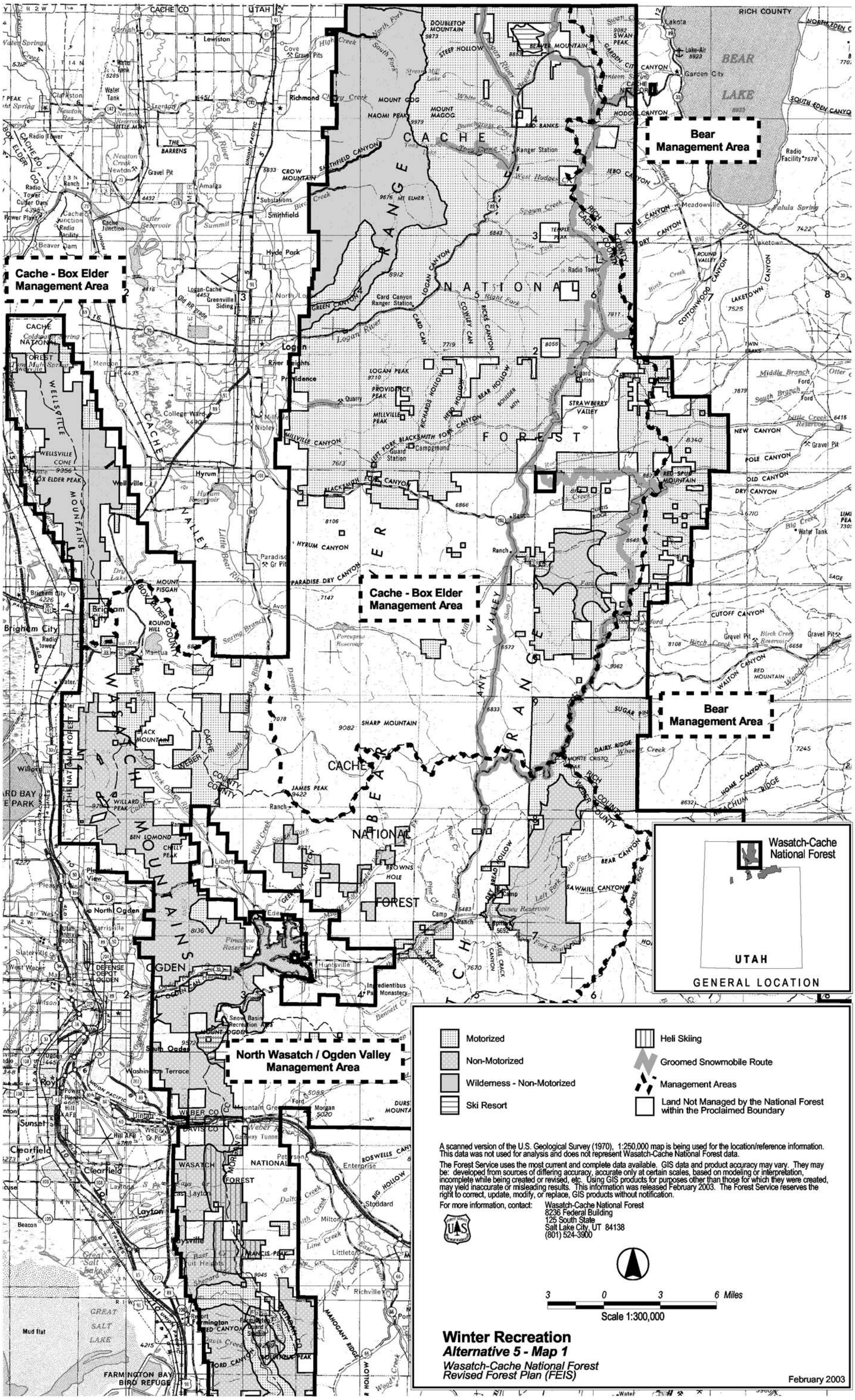
Scale 1:300,000

Winter Recreation

Alternative 4 / 1985 - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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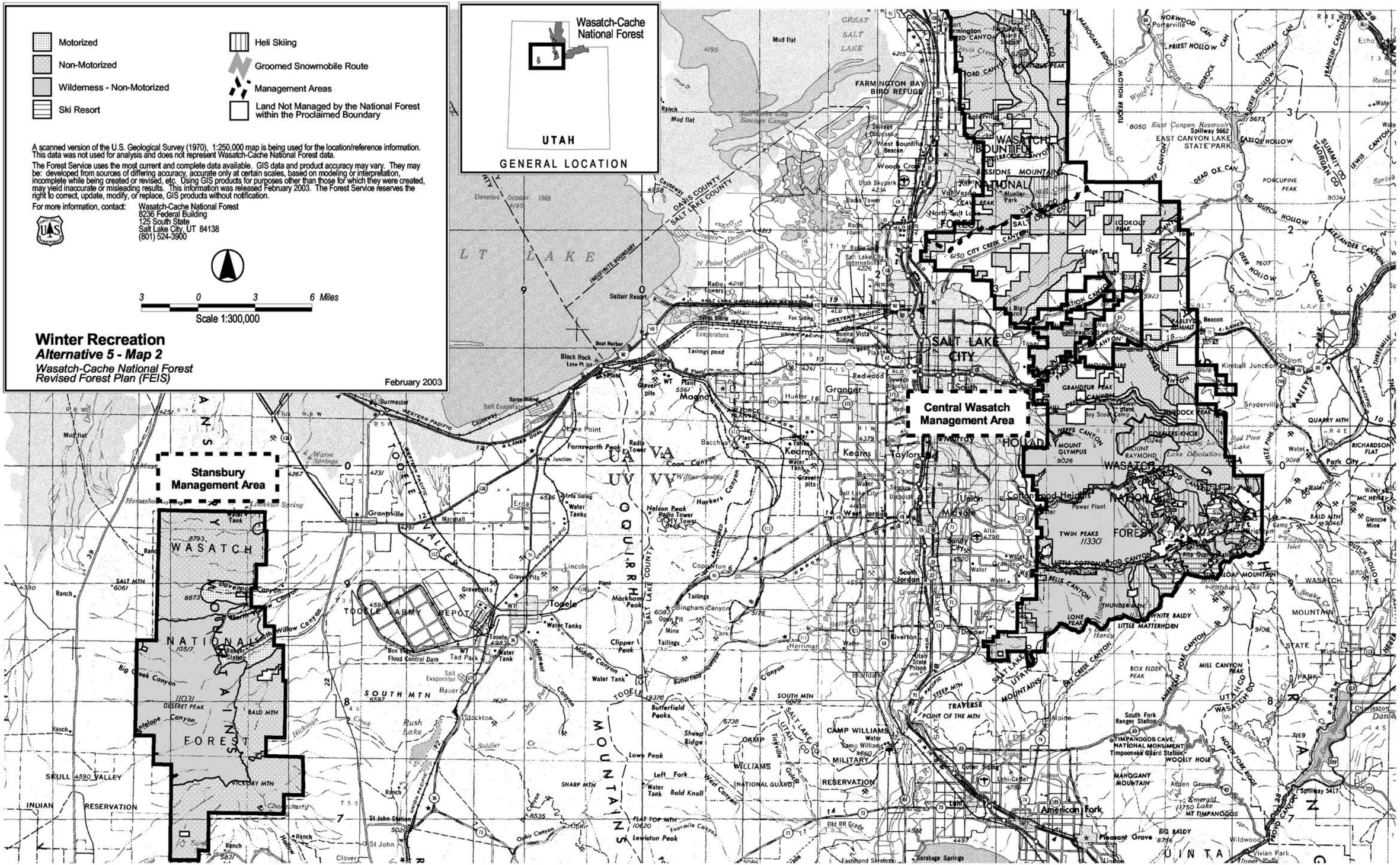
Salt Lake City, UT 84138
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 5 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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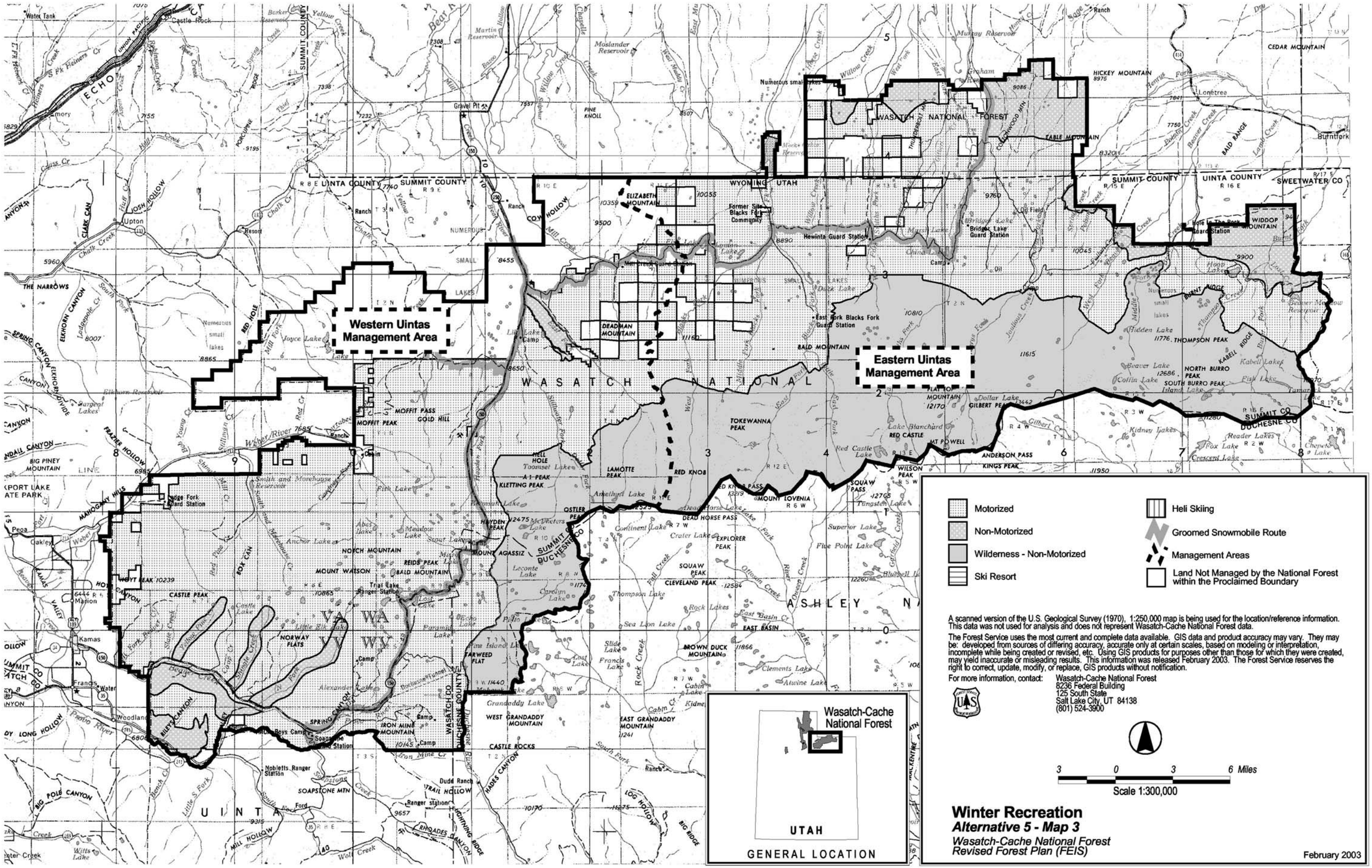
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 5 - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Central Wasatch Management Area
Stansbury Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
FARMINGTON BAY BIRD REFUGE
GREAT SALT LAKE
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
EAST CANYON LAKE STATE PARK
TWIN PEAKS 11330'
DESERET PEAK 11031
SOUTH MTN
SKULL VALLEY INDIAN RESERVATION
OQUIRRH MOUNTAINS
UINTA MOUNTAINS


Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SWEETWATER CO
DUCHESNE CO
WASATCH CO
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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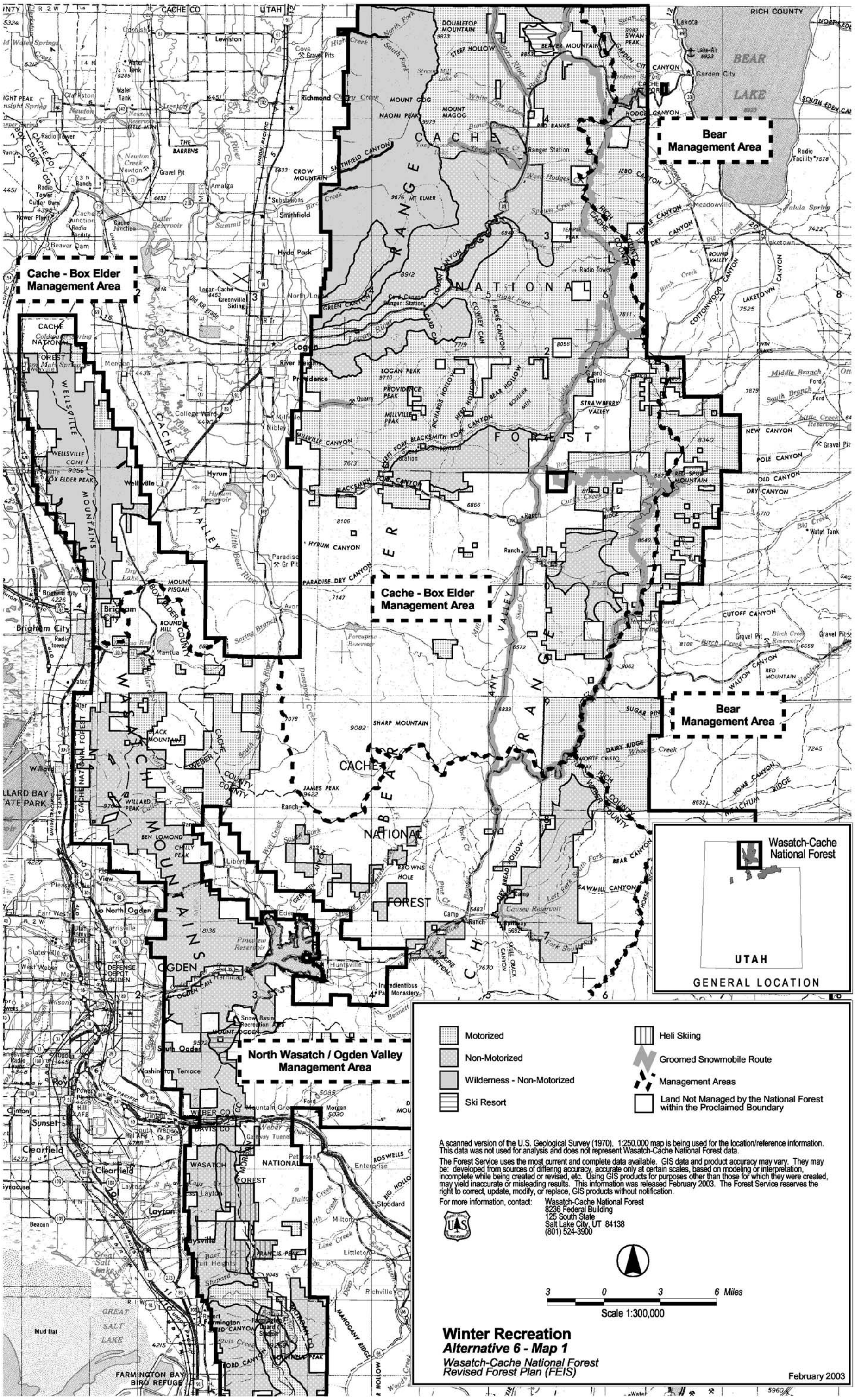
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 5 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Cache - Box Elder Management Area
Bear Management Area
Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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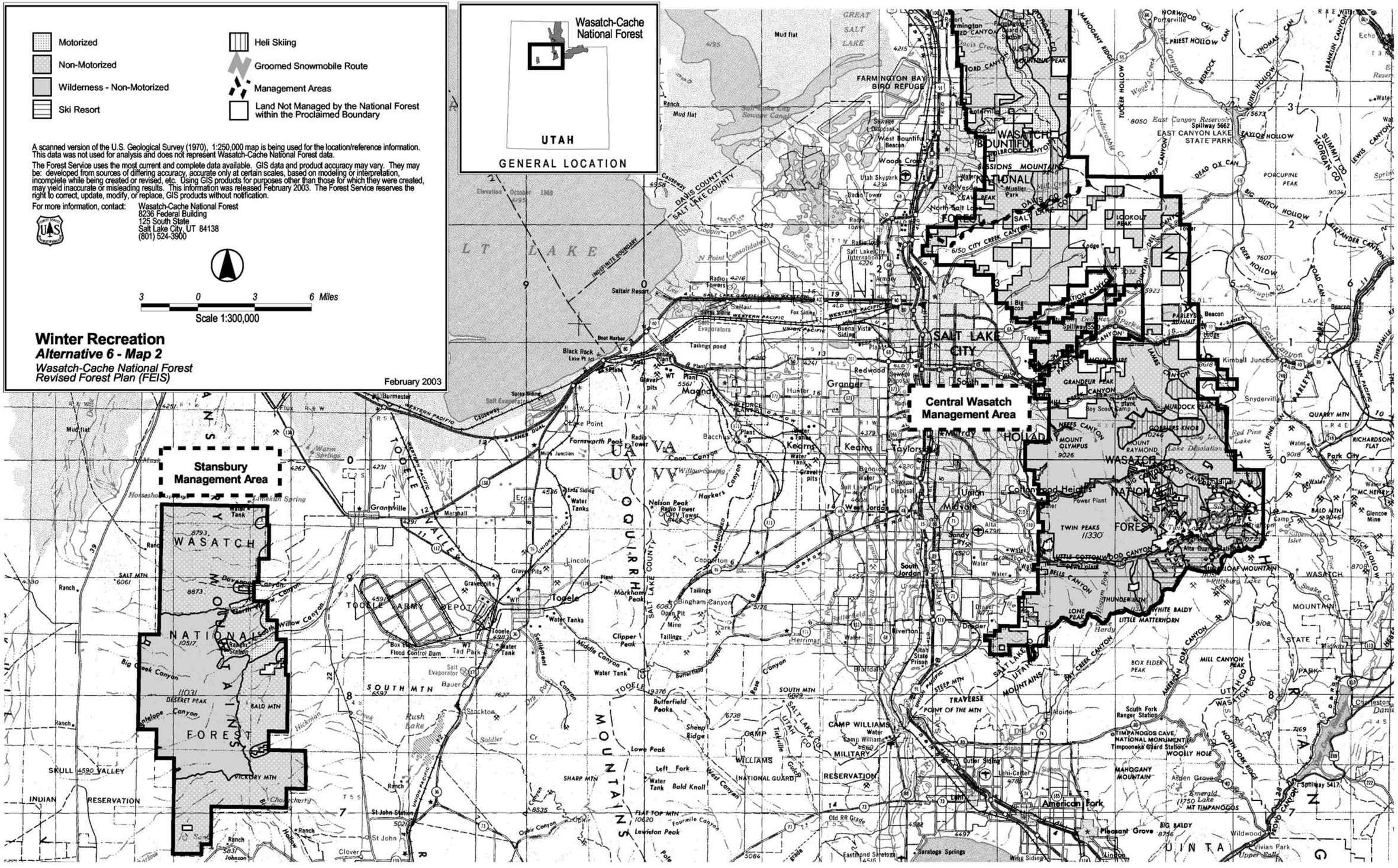
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 6 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003



Motorized

Non-Motorized

Wilderness - Non-Motorized

Ski Resort

Heli Skiing

Groomed Snowmobile Route

Management Areas

Land Not Managed by the National Forest within the Proclaimed Boundary

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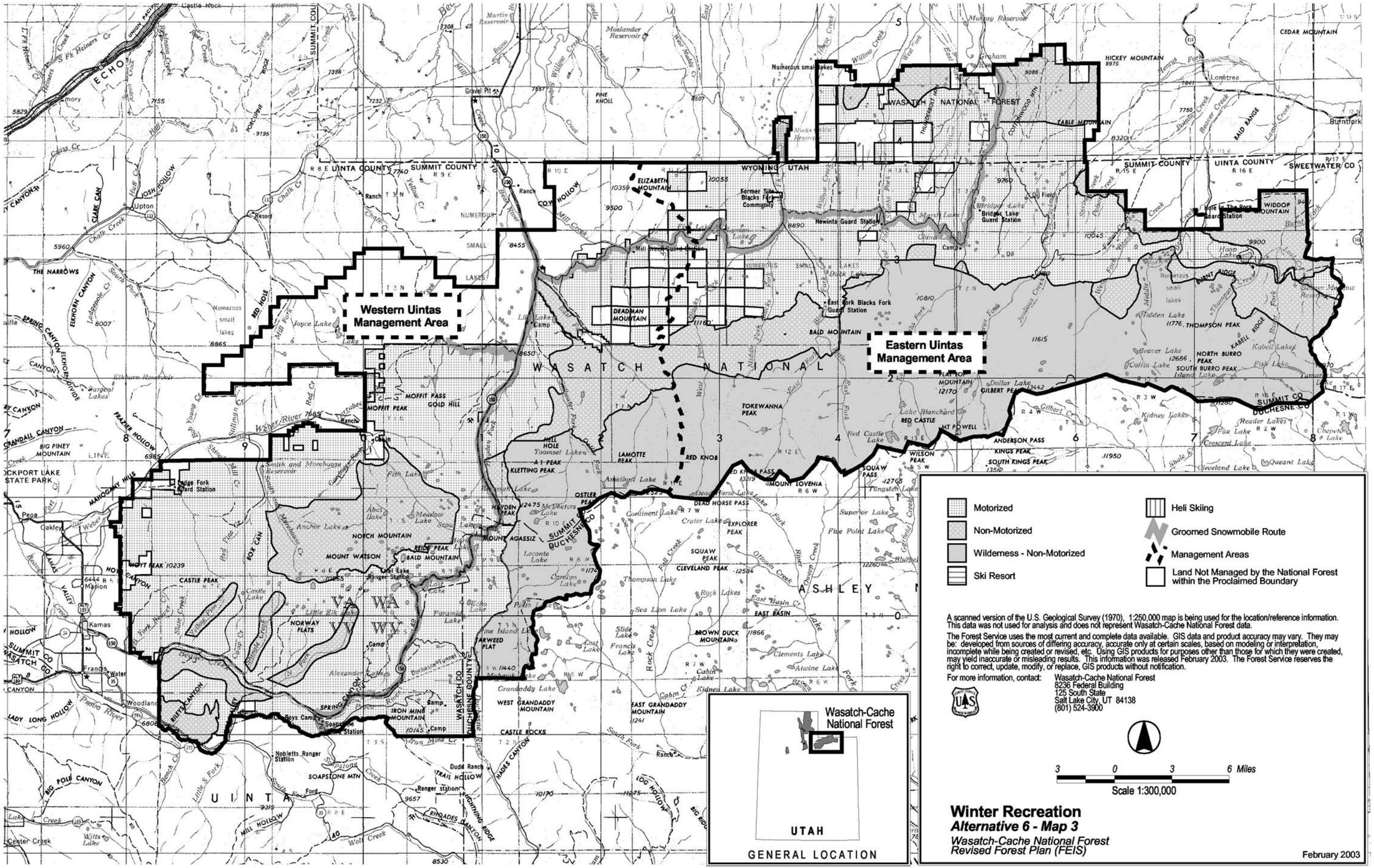
(801) 524-3900

Winter Recreation

Alternative 6 - Map 2

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003


Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SWEETWATER CO
SUMMIT CO
DUCHESNE CO
Motorized
Non-Motorized
Wilderness - Non-Motorized
Ski Resort
Heli Skiing
Groomed Snowmobile Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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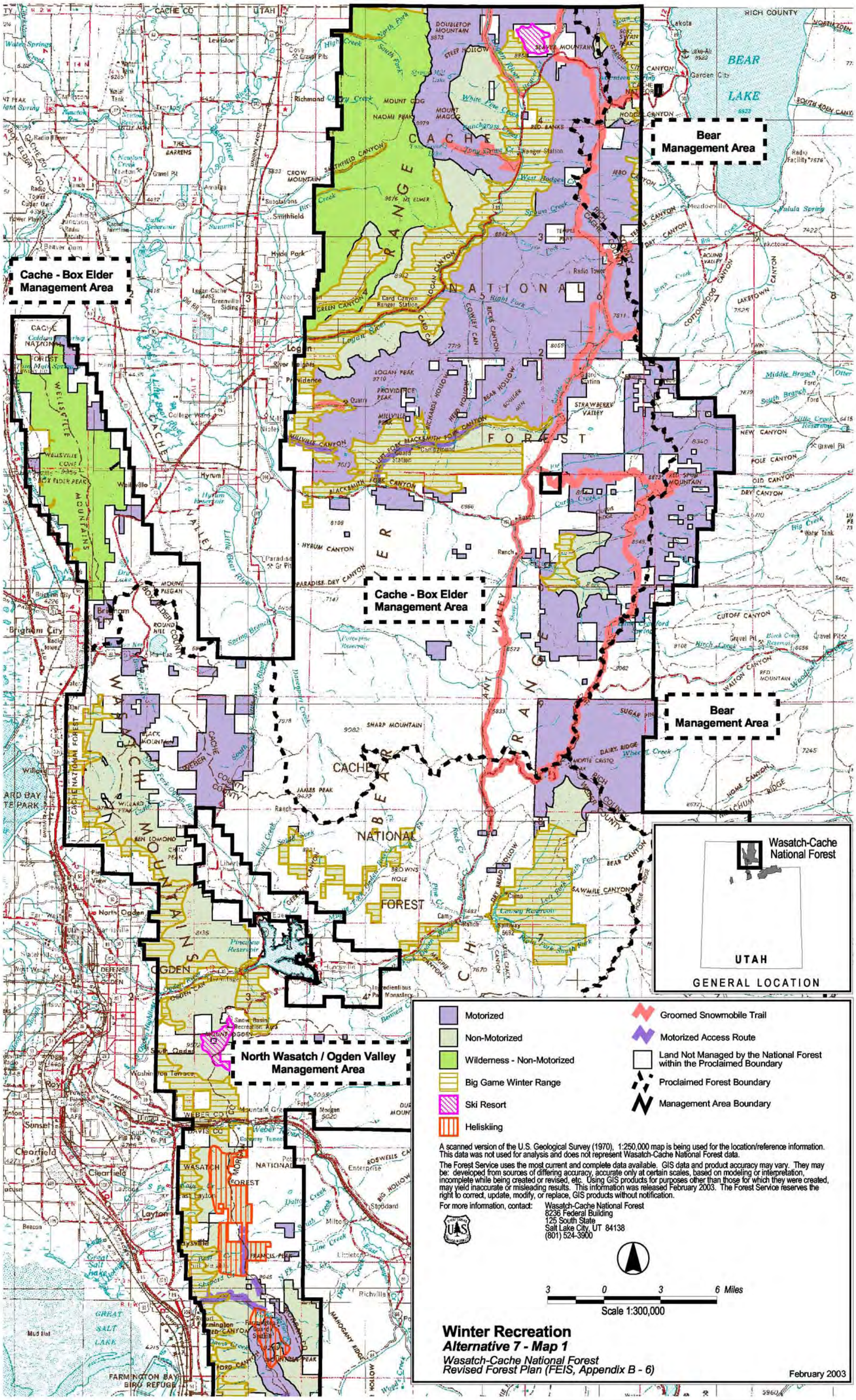
Salt Lake City, UT 84138
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Winter Recreation
Alternative 6 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Wilderness - Non-Motorized
Big Game Winter Range
Ski Resort
Heliskiing
Groomed Snowmobile Trail
Motorized Access Route
Land Not Managed by the National Forest within the Proclaimed Boundary
Proclaimed Forest Boundary
Management Area Boundary
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3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Alternative 7 - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS, Appendix B - 6)
February 2003

Motorized

Non-Motorized

Wilderness - Non-Motorized

Big Game Winter Range

Ski Resort

Heliskiing

Groomed Snowmobile Trail

Motorized Access Route

Land Not Managed by the National Forest within the Proclaimed Boundary

Proclaimed Forest Boundary

Management Area Boundary

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3 0 3 6 Miles

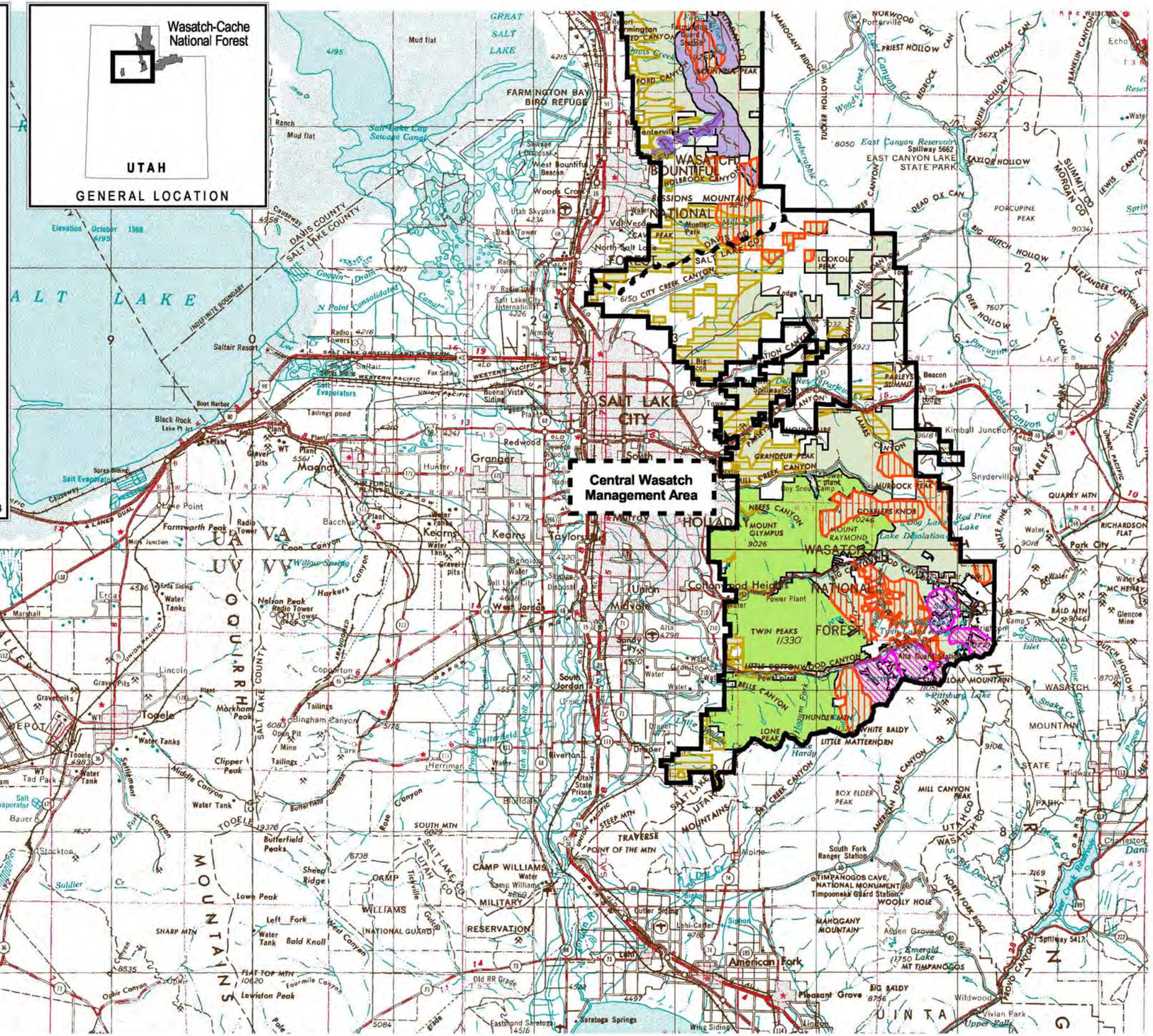
Scale 1:300,000

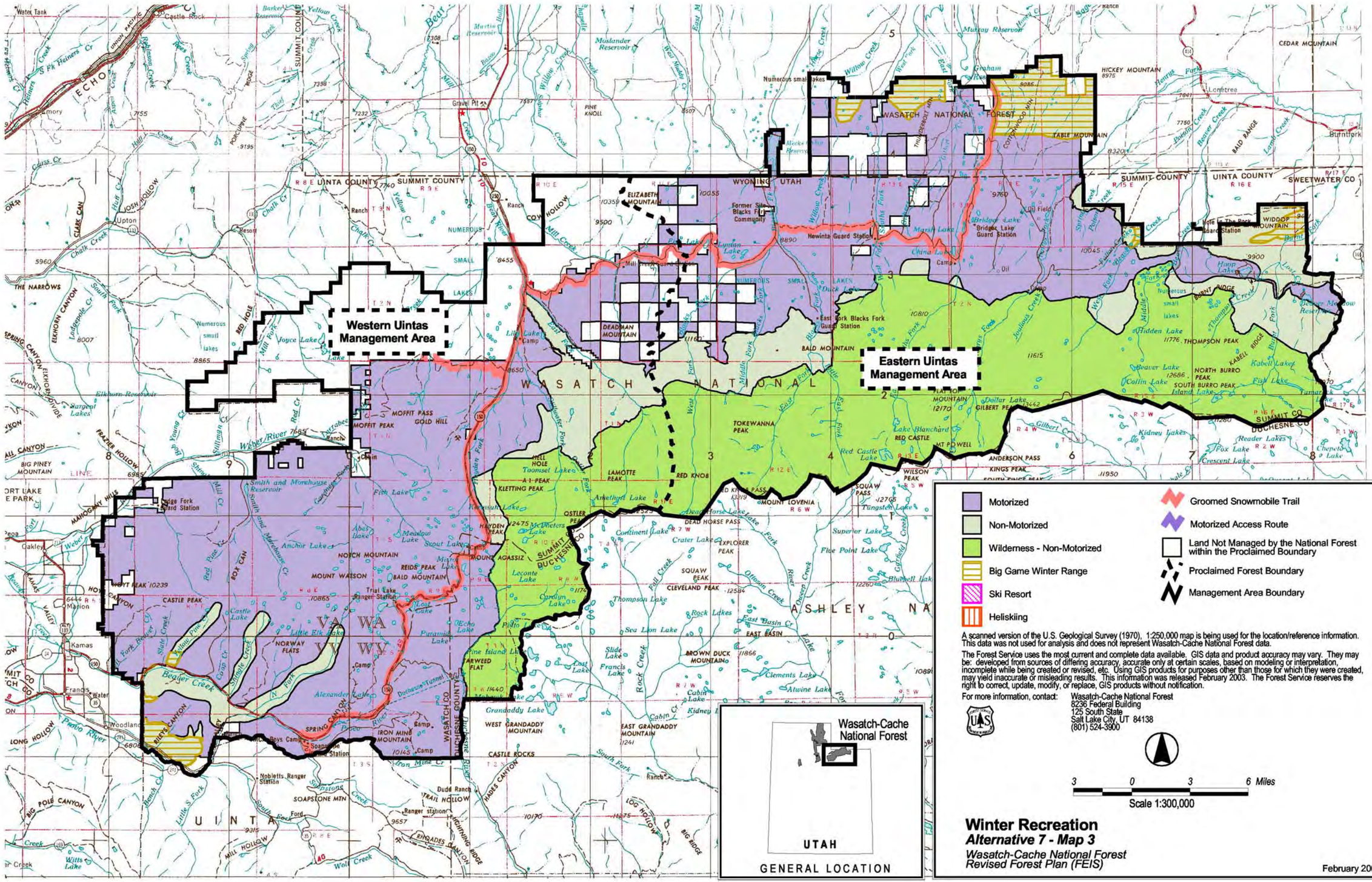
Winter Recreation

Alternative 7 - Map 2

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003




Western Uintas Management Area
Eastern Uintas Management Area
WASATCH NATIONAL FOREST
UINTA COUNTY
SUMMIT COUNTY
WYOMING
UTAH
SUMMIT CO
DUCHESNE CO
SWEETWATER CO
Motorized
Non-Motorized
Wilderness - Non-Motorized
Big Game Winter Range
Ski Resort
Heliskiing
Groomed Snowmobile Trail
Motorized Access Route
Land Not Managed by the National Forest within the Proclaimed Boundary
Proclaimed Forest Boundary
Management Area Boundary
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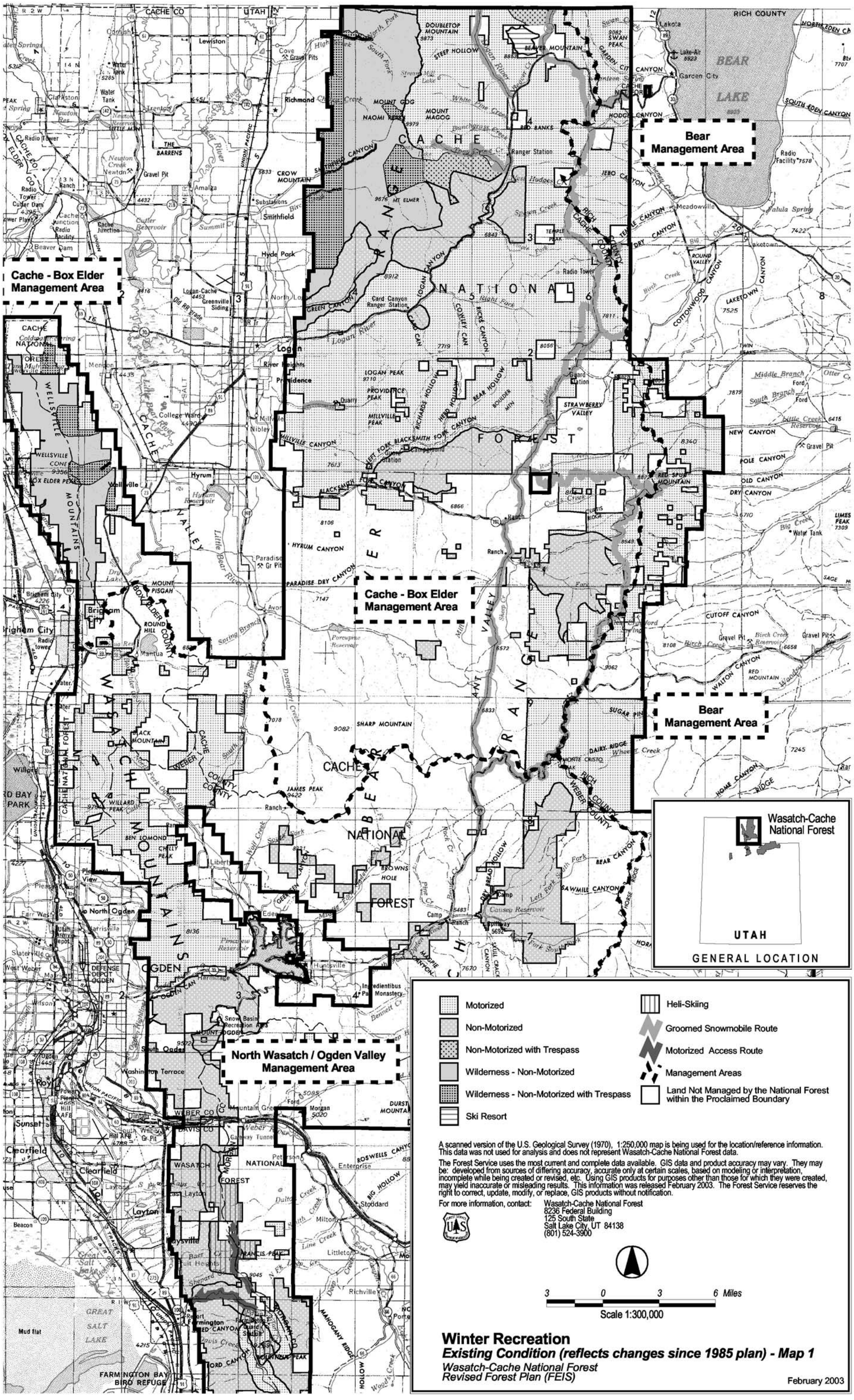
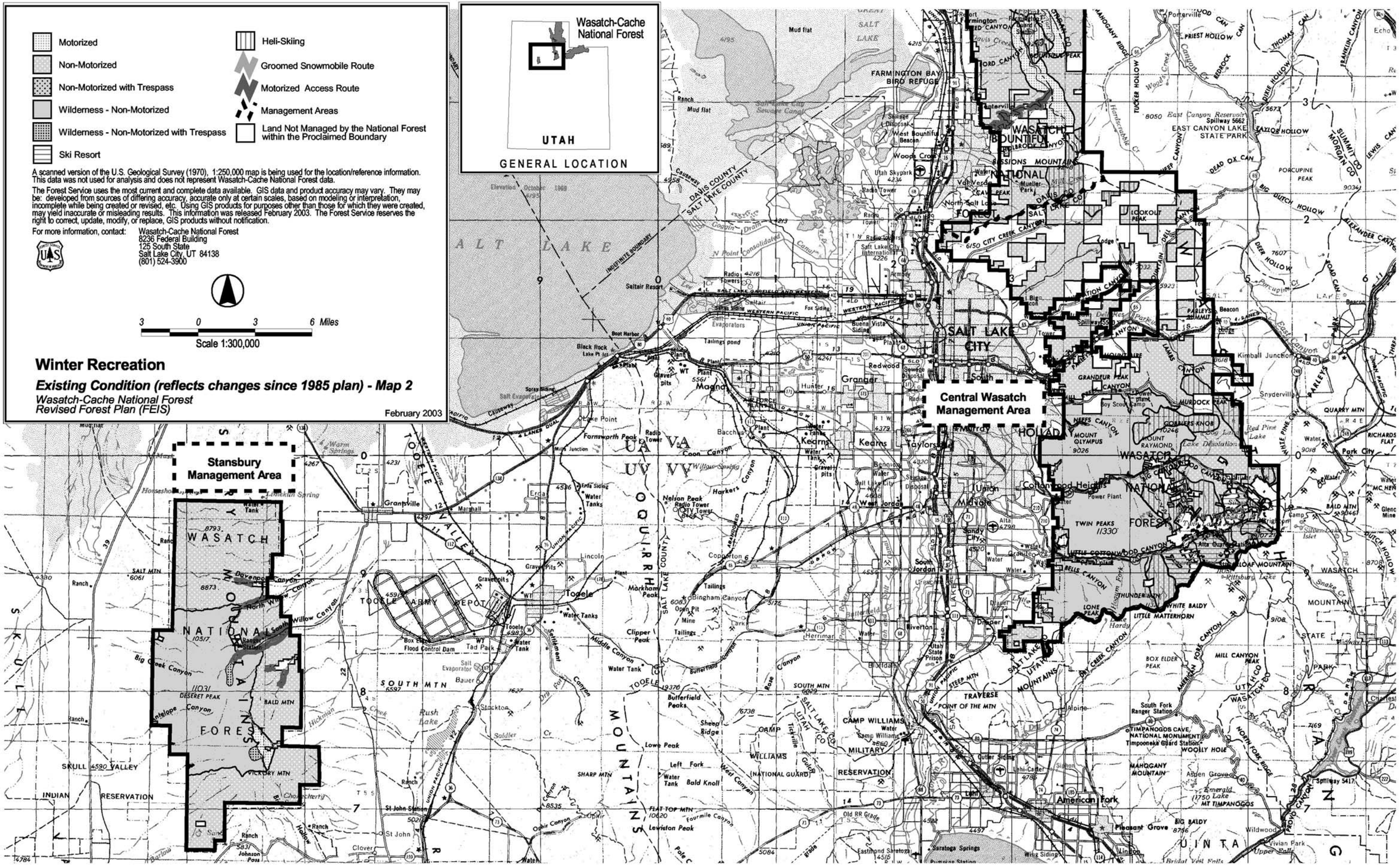
Salt Lake City, UT 84138
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Winter Recreation
Alternative 7 - Map 3
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Cache - Box Elder Management Area
Bear Management Area
North Wasatch / Ogden Valley Management Area
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Motorized
Non-Motorized
Non-Motorized with Trespass
Wilderness - Non-Motorized
Wilderness - Non-Motorized with Trespass
Ski Resort
Heli-Skiing
Groomed Snowmobile Route
Motorized Access Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
A scanned version of the U.S. Geological Survey (1970), 1:250,000 map is being used for the location/reference information. This data was not used for analysis and does not represent Wasatch-Cache National Forest data.
The Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be: developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created, may yield inaccurate or misleading results. This information was released February 2003. The Forest Service reserves the right to correct, update, modify, or replace, GIS products without notification.
For more information, contact:
Wasatch-Cache National Forest
8236 Federal Building
125 South State
Salt Lake City, UT 84138
(801) 524-3900
3 0 3 6 Miles
Scale 1:300,000
Winter Recreation
Existing Condition (reflects changes since 1985 plan) - Map 1
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003


Motorized
Non-Motorized
Non-Motorized with Trespass
Wilderness - Non-Motorized
Wilderness - Non-Motorized with Trespass
Ski Resort
Heli-Skiing
Groomed Snowmobile Route
Motorized Access Route
Management Areas
Land Not Managed by the National Forest within the Proclaimed Boundary
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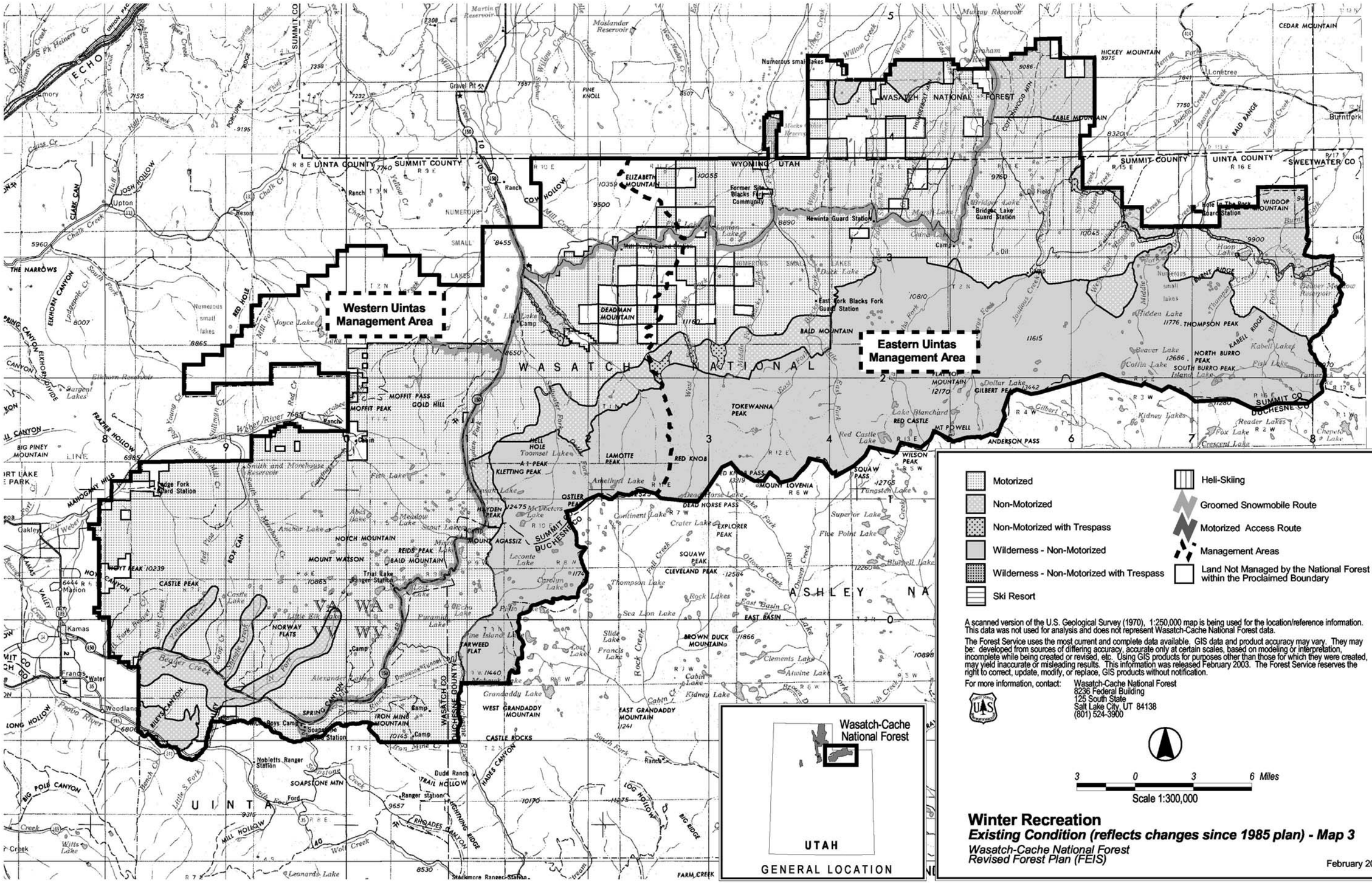
Winter Recreation
Existing Condition (reflects changes since 1985 plan) - Map 2
Wasatch-Cache National Forest
Revised Forest Plan (FEIS)
February 2003
Wasatch-Cache National Forest
UTAH
GENERAL LOCATION
Stansbury Management Area
Central Wasatch Management Area
WASATCH NATIONAL FOREST
SALT LAKE CITY
FARMINGTON BAY BIRD REFUGE
EAST CANYON LAKE STATE PARK
TOOELE ARMY DEPOT
CAMP WILLIAMS MILITARY RESERVATION
UTAH LAKE
SKULL VALLEY INDIAN RESERVATION
OQUIRRH MOUNTAINS
TOOELE VALLEY
UINTA MOUNTAINS
Tooele
Grantsville
Lehi
American Fork
Pleasant Grove
Saratoga Springs
Kearns
Taylorsville
Midvale
Sandy City
South Jordan
Riverton
Draper
Bluffdale
Herriman
Magna
Granger
Hunter
Kearns
Snyderville
Park City
Kimball Junction
Alpine
Highland
Cottonwood Heights
Holladay
Salt Lake City
Saltair Resort
Black Rock
Lake Point
Fornsworth Peak
Stockton
Clover
St John
Erda
Lincoln
Bacchus
Copperton
Bingham Canyon
Nelson Peak
Deseret Peak
Vickory Mtn
Bald Mtn
Salt Mtn
Twin Peaks
Mount Olympus
Mount Raymond
Grandeur Peak
Lone Peak
Timpanogos Cave National Monument
Mt Timpanogos
Big Baldy
Quarry Mtn
Porcupine Peak
Lookout Peak
Deer Hollow
Big Dutch Hollow
Alexander Canyon
Tucker Hollow
Redrock Can
Priest Hollow Can
Thomas Can
Franklin Canyon
Summit Co
Morgan Co
Lewis Can
Taylor Hollow
Dead Ox Can
Mahogany Ridge
Mud flat
Salt Lake City Sewage Canal
Saltair
Fox Siding
Buena Vista
Tailings pond
Evaporators
Gravel pits
Boat Harbor
Causeway
Indefinite Boundary
Davis County
Salt Lake County
Tooele County
Utah County
Wasatch County
Summit Co
Morgan Co
Elevation October 1969



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Winter Recreation

Existing Condition (reflects changes since 1985 plan) - Map 3

Wasatch-Cache National Forest
Revised Forest Plan (FEIS)

February 2003