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Forest Service

Caribou-Targhee
National
Forest

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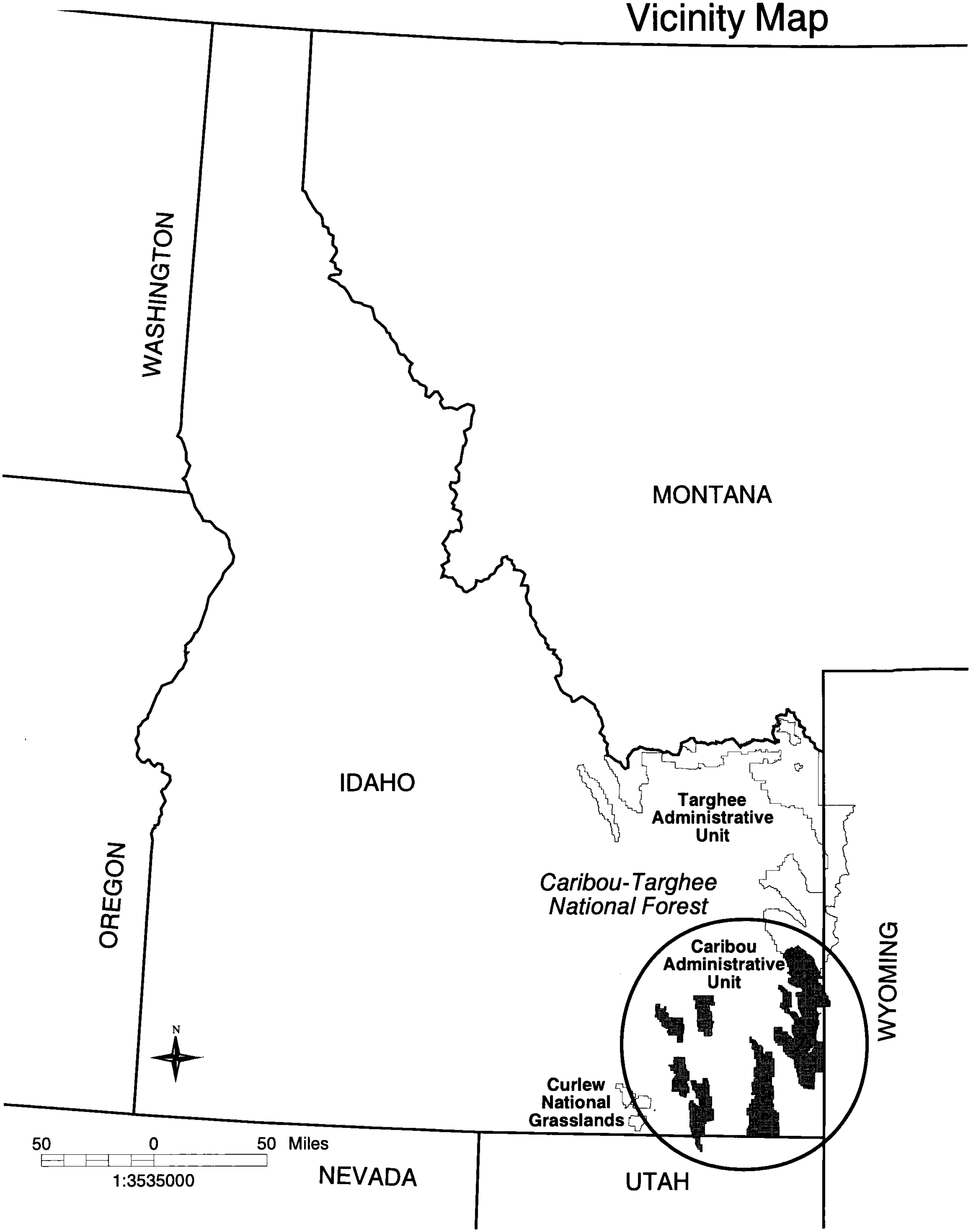
Final Environmental Impact Statement

For the

Caribou National Forest Revised Forest Plan

Volume I: Chapters 1, 2 and 3

Vicinity Map



Caribou-Targhee NF

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Final Environmental Impact Statement

Caribou Revised Forest Plan
Volume I

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Final Environmental Impact Statement

Caribou Revised Forest Plan
Chapter One—Purpose and Need

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Chapter 1 Purpose and Need for Action

Introduction to the Final Environmental Impact Statement

The Caribou National Forest Land and Resource Management Plan (1985) currently directs management of the Caribou National Forest; this plan is over fifteen years old. The Forest Supervisor has determined that important changes have taken place since the implementation of the current management plan in 1985. Revision of management plans is directed by the National Forest Management Act (NFMA) Regulations, 36 Code Federal Regulations (CFR) 219 and the Forest Service Directives System (Forest Service Handbook 1909.12).

This Caribou LRMP Revision was initiated under the 1982 Planning Regulations (36 CFR 219) when the Notice of Intent to prepare an Environmental Impact Statement was issued in August 1999. The Forest Service then revised the Forest Planning regulations through a year-long rule-making process that was completed in November 2000. The revised planning rule established new direction for conducting forest planning. Since the Caribou Revision started prior to the Final Rule, the Forest decided to complete the Revision using the 1982 Regulations while incorporating some of the ideas of the new regulations.

The Forest issued a Proposed Action (Alternative 2) to address the needs for change identified in the Analysis of the Management Situation (AMS). The public and the Forest managers identified nine significant issues that would drive the formulation of Alternatives to the original Proposal. This EIS presents the analysis upon which the Regional Forester will base his decision for the Caribou Revised Forest Plan.

Alternative 7R is the Agency's Selected Alternative.

THE PLANNING UNIT

The Caribou portion of the Caribou-Targhee National Forest (NF) is located in southeastern Idaho and overlaps into Wyoming and Utah. In the spring of 2000 the Caribou NF and Targhee NF were officially combined. The Targhee NF revised its Forest Plan in 1997 and will continue to be managed under the guidance of that document. The Caribou-Targhee NF administrative unit also includes the Curlew National Grassland (NG). The Curlew NG is managed under its own management plan, completed in the spring of 2002. Thus, the Caribou Revised Forest Plan addresses management of the Caribou portion of the Caribou-Targhee National Forest, hereinafter referred to as the "Caribou" or the "Forest". The Caribou is broken into three Ranger Districts: Westside, Soda Springs and Montpelier.

The Caribou lies mainly within the northern extent of the Great Basin Region. In general, it is an area of low effective precipitation and harsh climatic conditions. The Caribou is an area of high, rugged mountain ranges rising sharply from semi-arid sagebrush plains and agricultural valleys. Forestlands occupy approximately 50 percent of the Caribou, mainly above 6,000 feet in elevation. These areas support stands of Douglas-fir, subalpine fir, lodgepole pine, Engelmann spruce, and aspen. Shrubs such as sagebrush, rabbitbrush, maple, or juniper dominate the non-forested areas. The Caribou provides a wide variety of diverse habitats for the 334 species of terrestrial vertebrate wildlife known or suspected to occur on the Forest. Five species listed under the Endangered Species Act (ESA) are also associated with the Caribou. The water bodies on the Caribou provide habitat for a variety of aquatic, plant, insect, and fish species, including the Bonneville and Yellowstone cutthroat trout.

The Caribou portion of the Caribou-Targhee encompasses eleven counties in three states. Bannock County, a retail and commercial hub for southeastern Idaho, is at the center of this "zone of influence." Several urban centers use the Caribou-Targhee NF for recreation and commercial uses.

Purpose and Need

PROPOSED ACTION

The Forest Service is preparing an Environmental Impact Statement in conjunction with a revision of the Land and Resource Management Plan (hereinafter referred to as the Revised Forest Plan) for the Caribou portion of the Caribou-Targhee National Forest. This Revised Forest Plan will do the following:

- Establish multiple-use goals and objectives [36 CFR 219.11]
- Establish forest-wide management requirements (standards and guidelines)
- Establish management areas and management area direction through the application of management prescriptions
- Identify lands not suited for timber production [36 CFR 219.7(d)]
- Identify lands not suited for livestock forage production [36 CFR 219.7(d)]
- Establish monitoring and evaluation requirements
- Recommend areas for official designation of Wilderness

The authorization of project-level activities on the Forest occurs through separate project, or site-specific, decision-making. Project-level decisions must comply with National

Environmental Policy Act (NEPA) procedures and must include a determination that the project is consistent with the Forest Plan. The proposed action does not address specific project actions but will set the Forest-wide direction that frames those actions.

Regulations found in [36 CFR 219.12 (b)] require the Forest Supervisor to determine the major public issues, management concerns, and resource use and development opportunities to be addressed in the planning process. The combined effects of the needed changes demand attention through plan revision or amendment. The major revision topics described below influenced the decision to revise management for the Caribou NF. Taken collectively, these "needs for change" are the major topics for the Caribou Forest Plan Revision. The Forest Supervisor has determined that changes in resource conditions, technical knowledge, data improvement, or public opinion of national forest resource management have created a need to change management direction for the Caribou NF.

Alternative 2, described in Chapter 2 of this DEIS, is the detailed Proposed Action.

DECISIONS TO BE MADE

The existing management plan is more than ten years old. The Forest Supervisor has determined important changes have taken place since the implementation of the current management plan. It established key decisions for the long-term management of National Forest System lands. These include:

1. Establishment of forest-wide multiple use goals and objectives, including the description of the desired future condition (DFC) [36 CFR 219.11]
2. Establishment of forest-wide management requirements (standards and guidelines to fulfill the requirements of 16 USC 1604, (The National Forest Management Act) applying to future activities [resource integration requirements 36 CFR 219.13 to 36 CFR 219.27]
3. Establishment of management areas and direction applying to future activities in each management area [36 CFR 219.11(c)]
4. Determination of the suitability and potential capability of lands for producing timber and forage for grazing animals, [36 CFR 219.14 and .20], and designation of lands not suitable for such activities
5. Establishment of monitoring and evaluation requirements found in [36 CFR 219.11(d)]
6. Recommendation of Roadless Areas to Congress for Wilderness classification [36 CFR 219.17]

The revision of the Caribou Forest Plan will include decisions on these six elements of programmatic direction. These first stage Forest Plan decisions establish the direction which allows or restricts future project level proposals. The Record of Decision (ROD), issued at the

conclusion of the National Environmental Policy Act (NEPA) process, will select one Alternative for implementation as the Caribou Revised Forest Plan. Decisions made in the final ROD apply only to the Caribou portion of the Caribou-Targhee National Forest lands and not on lands under other private or public ownership. The Revised Forest Plan provides the overall guidance (goals, objectives, standards and guidelines, and management area direction) to achieve the desired future condition for the area analyzed and contains specific management area prescriptions for the Forest.

The authorization of project-level activities within the planning area occurs through project decision-making, the second stage of forest planning. Project-level decisions must comply with NEPA procedures and must include a determination that the project is consistent with the management plan. No project-level decisions will be made in this planning process, such as permitted levels of livestock grazing, timber sale projects, or whether specific roads or trails are open or closed. These concerns will be addressed in separate NEPA analyses and decisions that include public involvement and site-specific environmental effects disclosure.

PURPOSE AND NEED FOR THE PROPOSED ACTION

Generally, Forest Plan revision does not result in a wholesale change of management direction. Accordingly, the Forest Plan revision will concentrate on management direction that needs improvement or clarity, incorporates new scientific findings, or is required by regulation. Current management direction that has proven effective and requires no change will continue forward, as is, through the analysis process. In revising the Forest Plan, the regulations focus the process by stating: ‘‘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)]. Throughout this planning process portions of the Plan, identified as "needs for change," will be emphasized. Needs for Change” are listed by the issue(s) they prompted.

The Forest completed two five-year monitoring reports, one in 1992 and a second in the fall of 1997. Using the results and findings in the monitoring reports, public input, and Forest Plan implementation experience, needs for change in management direction were identified. Several sources were used in determining the needs for changes in the current Forest Plan. These sources include:

- Public comments concerning implementation of current direction
- Findings from the two Forest Plan monitoring reports
- Regulatory, manual, and handbook requirements
- Draft 1995 Resources Planning Act (RPA) Program
- New information, such as the Interior Columbia Basin Ecosystem Management Plan Scientific Assessment and other research

- Public comments received regarding the findings in the Initial Analysis of the Management Situation (AMS)

ANALYSIS OF THE MANAGEMENT SITUATION (RESOURCE CONDITIONS)

In April 1999, the Caribou National Forest published an Initial Analysis of the Management Situation (AMS). The AMS described current management and resource conditions on the Forest. Based on these conditions, forest managers and resource specialists identified significant "needs for change" and proposed a desired range of future conditions for forest resources. "Needs for change" included subject areas that:

- Must be reviewed in accordance with federal regulations (timberland suitability, Wild & Scenic Rivers, and roadless area reviews for Wilderness recommendation);
- Are urgent resource issues that need improved direction as identified through monitoring or other scientific assessments relative to the Forest;
- Are concerns the public identified through site-specific project implementation of the 1985 Forest Plan

Some examples of issues that were evaluated during the development of the AMS and not identified as needs for change include lands programs, small hydropower, and other special uses.

The AMS was mailed to more than five hundred interested individuals, non-government organizations, city, county and state governments, and other federal agencies. Public comments were encouraged regarding the findings disclosed in the AMS. As a result of the analysis of the comments received, the Forest Supervisor determined the public identified additional "needs for change" that will be included in the Forest Plan Revision. These additional "needs for change" are listed by the issue(s) they prompted

The Forest compiled responses to public comments received on the AMS. The Responses to Public Comments are available upon request from the Caribou-Targhee National Forest. The AMS and the Responses to Comments represent the Final "Analysis of the Management Situation" and conclude this step of the revision process.

DESIRED FUTURE CONDITION

The condition of terrestrial and aquatic ecosystems is addressed through the desired range of future conditions (DFCs). The DFCs address vegetation cover types, their structure and composition, disturbance patterns, wildlife habitats, watershed processes, riparian conditions, and aquatic species habitats. The desired range of future conditions is a narrative vision of the long-term condition of the land that could be expected in 50 to 100 years if objectives in the selected Alternative are achieved. Alternatives may result in different long-term conditions, or

objectives may take longer to achieve. The proposed Desired Range of Future Conditions is detailed in Chapters 4, 5, and 6 of the Initial AMS and will not be reiterated here.

RESPONSIBLE OFFICIAL

The Responsible Official for the Caribou Revision and final Decision is the Intermountain Regional Forester in Ogden, Utah.

FRAMEWORK FOR THE DECISION

The Regional Forester will decide which alternative best meets the needs for future management of the Caribou National Forest. This alternative will be reflected in the desired future conditions, goals, objectives, standards and guidelines in the Revised Plan. The decision and Revised Plan will include management direction, land allocations, monitoring, and mitigation.

Management Direction

TRIBAL TRUST RESPONSIBILITIES

The Shoshone-Bannock Tribe has ancestral Treaty Rights to uses of the Forest. The relationship of the United States government with American Indian tribes is based on legal agreements between sovereign nations. The Fort Bridger Treaty of July 3, 1868 provided for the establishment of the Fort Hall Indian Reservation. It also granted hunting and fishing rights to tribal members on "all unoccupied lands of the United States." This right applies to all public domain lands reserved for National Forest purposes that are presently administered by the Caribou-Targhee National Forest. These rights are still in effect, and management actions recognize these rights. Consultation with the Shoshone-Bannock Tribal Council is required on land management activities and land allocations that could affect these rights.

FOREST PLANNING REGULATIONS

The Caribou Forest Plan Revision has been underway since August 1999. The planning team was approaching release of the DEIS and Draft Revised Plan for public review and comment when the Forest Service released new regulations for implementing the National Forest Management Act. Because of the timing and stage of the Caribou Revision at that time, the Regional Forester decided to proceed under the original 1982 Planning Rule. The intent of the new regulations—science-based ecosystem management, social and economic sustainability;

interdisciplinary, integrated planning; collaborative citizen participation; and dynamic, realistic plans—can be achieved by continuing under the 1982 Planning Rule for this revision of the Caribou Forest Plan.

ECOSYSTEM MANAGEMENT

The following Ecosystem Management Goals provide a framework for Forest planning that merges science and ecosystem capability with societal values to help make choices about dynamic systems on the Forest. These overarching forest-wide goals are the ecological centerpiece for the Forest Plan Revision:

- Maintain ecological processes
- Manage in the context of multiple ecological scales and time frames
- Maintain viable populations of native and desired non-native species
- Encourage social and economic resiliency
- Recognize the human concept of "sense of place"
- Manage to maintain the mix of ecosystem goods, functions, and conditions that society wants

The northern portion of the Caribou National Forest is within the area of land covered by the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The integrated science assessments from this effort have been used in developing direction and assessing conditions and trends for the Forest. The integrated science assessments contain information that provide context at a broad, multiple-state scale. The information on forestlands, rangelands, aquatic and hydrologic integrity, ecosystem pathways and disturbance patterns, and the current and projected conditions of fish, wildlife and plant species was used to help identify need for change topics.

Other broad scale assessments and direction have been incorporated, as appropriate, into the Caribou Revision. Direction from conservation strategies and agreements such as the Lynx Conservation Assessment and Strategy (LCAS) and cutthroat trout strategies has been tailored to the Caribou and included in the Plan.

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT (RPA), 2000

The 1982 NFMA regulations at [36 CFR 219.12(f)(6)] require at least one Alternative be developed that responds to and incorporates the Resources Planning Act (RPA) Program's tentative resource objectives for each national forest/grassland as displayed in regional guides. However, the RPA Program establishes national guidance for the national forests/grasslands by providing program emphasis and trend rather than specific, quantified output targets for individual Forest Service programs. As a result, no resource objectives were quantified for each region to display in regional guides, which would then be passed on to individual forests/grasslands.

The RPA is updated every five years and has three components: (1) roles in natural resource management for Forest Service management; (2) Forest Service program responses to contemporary issues; and (3) long-term strategies to guide the program development and budget process. It emphasizes four high priority themes: (1) recreation, wildlife, and fisheries resource enhancement; (2) environmentally acceptable commodity production, (3) improved scientific knowledge about natural resources; and (4) response to global resource issues. This guidance was used in developing action Alternatives for the DEIS and the Selected Alternative, Alternative 7R. For purposes of the analysis Alternative 7R has been identified as the most consistent with RPA and is discussed in more retail in the Record of Decision.

NATIONAL FIRE PLAN

The National Fire Plan (NFP) was developed primarily in response to several situations: the 2000 fire season in the West, the Forest Service Report to the President, and the funding allocation from Congress. The NFP emphasizes five key points:

- Keypoint 1 Firefighting Resources
- Keypoint 2 Rehabilitation and Restoration
- Keypoint 3 Hazardous Fuel Reduction
- Keypoint 4 Community Assistance
- Keypoint 5 Accountability

The Caribou Plan Revision addresses the NFP, particularly Keypoints 2 and 3, by emphasizing hazardous fuel reduction in areas at risk of uncharacteristic wildland fires by providing direction for rehabilitation and restoration. The NFP calls for working with communities to reduce fire risk, particularly in the wildland urban interface. The Revision addresses this issue in the action alternatives and the proposed Plan. Keypoints 1 and 4 are budget driven and therefore not addressed directly by the Plan. Keypoint 5 is a reporting and monitoring item.

NATIONAL FOREST SYSTEM ROAD MANAGEMENT RULE

In January of 2001, the Forest Service issued the final National Forest System Road Management Rule. This rule revises regulations concerning the management, use, and maintenance of the National Forest Transportation System. According to the Rule, Forests must complete a Roads Analysis prior to completing the Forest Plan revision. The roads analysis is designed to provide decision-makers with information to manage road systems that are safe and responsive to public needs and desires, are economically and efficiently managed, and have minimal negative ecological effects on the land. This Roads Analysis has been completed as part of the planning process. It is available upon request from the Caribou-Targhee National Forest Headquarters in Idaho Falls, Idaho.

Issues/Public Involvement

Throughout the planning process, the interdisciplinary team (IDT) gathered public input on issues, the proposed action, and Alternatives to the proposed action. Issues were developed from IDT resource concerns, management "needs for change" as summarized in the Initial Analysis of the Management Situation (AMS), and public comments received through the official scoping process, public meetings, and other public involvement tools, such as the "Build Your Own Alternative Exercise."

Preliminary issues were identified through public comments received on the Initial AMS and from Scoping on the Proposed Action. Issues were grouped into categories. The IDT further refined and clarified the issues and presented a preliminary briefing to Forest Management Team members on November 3, 1999. A package of preliminary issues was finalized for use in public meetings during December 1999.

The scoping process included a public meeting, briefings with interested stakeholders, letters and updates, and the development of a web homepage. These activities were used to identify the issues, Alternatives, and concerns to be considered in the development of a Revised Land and Resource Management Plan and to keep the public informed and involved throughout the planning process. (See Chapter 6 for a full discussion of public involvement activities.)

Nine significant planning issues were identified through this public process:

- Access and Recreation Management
- Economics
- Ecosystem Management
- Livestock Grazing
- Minerals Operations, Reclamation and Hazardous Substances Management
- Riparian/Wetland Areas, Aquatic Habitat and Water Quality
- Timber Sale Program
- Recommended Wilderness and Roadless Area Management
- Wildlife Habitat Management

Each of the issue statements is written in an attempt to be unbiased, to show conflicts, and to be as specific as possible at this point in the planning process. It should be understood the EIS analyzes direct, indirect, cumulative, irretrievable and irreversible effects for each Alternative in relationship to each of these significant issue statements. Indicators were assigned to each issue to show the differences among Alternatives.

ISSUE 1 – RECREATION, ACCESS, AND SCENERY MANAGEMENT

Recreation policies, user preferences, and measurements of quality have changed since the existing Forest Plan was written in 1985 and need to be incorporated into a Revised Forest Plan. The increased recreation demand for and use of the Forest, combined with a wide range of recreation preferences, has led to some contention between recreationists (particularly motorized, i.e., snowmobilers, versus non-motorized, i.e., cross-country skiers). This public contention, coupled with agency responsibilities and directives, has lead to increasing discussion and debate over how the Forest lands should be designated for recreation in the Revised Forest Plan.

General Resource Conditions[1]

Currently, about forty percent of the Forest is open to cross-country travel. Analysis will consider changing some of the areas to "open on designated routes only." Currently, the Forest has a policy of "no net gain" in motorized routes. This does not address high route densities in localized areas. The analysis may also consider limits on developing new motorized access routes at a smaller scale than the entire Forest.

Public Concerns[2]

Maintain/Increase Motorized Access to the Forest

- Motorized access should remain unchanged because it is suitably functioning.
- Motorized access on R.S. 2477 roads should be maintained, as they are historically significant forest access routes and should be available to the public.
- In view of the Americans with Disabilities Act, the Forest Service should strive to provide access to public lands for challenged citizens (including older Americans) who may be denied recreation opportunities if motorized access is reduced.
- Some/all snowmobile restrictions should be lifted Forest-wide, including the Mt. Naomi area, in response to the increasing popularity of the sport.
- Some/all roadless areas should be managed as semi-primitive motorized, because the "public's" interest in motorized recreation has increased and the amount of "public" land available for such recreation should be increased proportionately.
- Open road and motorized trail density standards should increase (or, at the very least, stay the same) due to the obvious, increasing public demand for the resource.

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[1] Summarized from 1999 Caribou National Forest, Initial AMS. For a more in depth analysis of the background/current conditions of this issue, see Chapter 3.

[2] Summarized from public comments, for an explanation of the involvement process, Appendix A.

Decrease Motorized Access to the Forest

- Cross-country motorized travel should be closed and motorized use restricted to designated routes, because off-road vehicles are encroaching on wildlife, causing degradation of habitat and disturbance/disruption of wildlife populations.
- Roadless and recommended wilderness areas should be managed as semi-primitive, non-motorized in order to ensure the utmost protection of wildlife and habitat, as well as to protect the public's right to solitude and primitive recreation experiences.
- Off-road vehicles present noise and air pollution problems in forested areas where recreationists are trying to get away from such urbane problems.
- Motorized trail density should be reduced because off-road vehicle use has not been strictly monitored/enforced in the past and flagrant misuse/abuse of habitat is likely to increase proportionately to the increase in allowed access and use of Forest land.

NEEDS FOR CHANGE

- Establish open road and trail density levels in prescriptions in all Alternatives during Plan revision.
- Evaluate and consider changing some or all of the "areas open to off-road motorized use" to "areas open to designated routes only" through a reasonable range of Alternatives.
- Continue to evaluate travel management options at the site-specific project level described in the 1996 Travel Plan Assessment process paper
- Establish management direction for roadless areas considering the various values associated with roadless areas.

INDICATORS

A 1 Recreation Opportunity Spectrum (ROS) shown in percentage of acres in each class.

A 2 Estimated acres open to cross-country motorized use during the snow-free season.

A 3 Motorized and Non-motorized route opportunities.

ISSUE 2 – SOCIAL AND ECONOMIC ENVIRONMENT

Ecosystem management is an ecological approach to land management used by the Forest Service to achieve the mandate of multiple use. It blends the needs of people and their environmental values with physical and biological elements to maintain diverse, productive, resilient, and sustainable ecosystems. As humans are a part of the ecosystem, their conditions are shaped by it, and in turn, people shape the ecosystem. It is the human aspect of economics, in relation to Forest planning, that is addressed in this issue.

The Zone of Influence for this plan includes nine[3] counties of citizens that have strong historical, emotional, and economic ties to the Forest. The public concerns that pertain to this issue are founded in the debate of how to best meet the economic/social needs of the public, while considering society's environmental values, and responsibly caring for the land. Decisions made in the Forest planning process may result in changes to the economic condition of local communities and may influence regional and national markets.

General Resource Conditions

Livestock grazing, timber production, mineral exploration/development, and recreation activities are key sources of income to communities dependent on Forest resources for the generation of revenue. As alternatives are developed and their effects are analyzed, consideration will be given to concerns such as local community stability, community development patterns, goods and services, employment, current/traditional resource users, and Forest revenue.

Public Concerns

Maintain/Increase the Output of Traditional Forest Commodities (i.e., grazing, timber, and mining)

- Citizens are concerned that changes in Forest management may result in job and income loss and reductions in the 25% Fund and the Payment-in-Lieu of Taxes (PILT) Fund.
- Recreation oriented employment does not pay as much as logging, mining, and ranching jobs, so the Forest should offer a stable level of products to meet regional demand.
- Long-time residents have economic and social ties to the Forest. For example, local ranchers with traditional water and/or grazing rights, which are necessary for their operation, want to ensure that their lifestyles and customs will be available to future generations.

Substitute/Eliminate the Output of Traditional Forest Commodities

- Facilitate a low level of development, emphasizing recreation, hunting, and fishing in lieu of traditional commodities in order to create viable recreational employment opportunities.
- Scenic and recreational values should be considered as/more important than consumptive commodities.
- The Caribou Forest should be maintained in a natural, unaltered state so that every citizen (including non-locals) can draw comfort and satisfaction from knowing that the National Forest and its resources are being preserved for current and future generations.

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[3] The National Forest System (NFS) lands administered by the Caribou are within eleven counties, and twelve counties lie very close to the Forest. For this analysis, however, the Zone of Influence encompasses nine counties. (See Chapter 3, Issue 2, Socioeconomics.)

NEEDS FOR CHANGE

- Assess, consider and disclose changes in forest management that may have social and economic effects on Tribes, local, regional, and national entities, and other agencies.
- Assess, consider and disclose changes in forest management that may affect the life-style and cultural tradition of Tribes, area residents, and local communities.

INDICATORS

EC 1 Changes in jobs

EC 2 Changes in incomes

EC 3 Present Net Value (Financial and Economic Efficiency)

ISSUE 3 - ECOSYSTEM MANAGEMENT

One of the main distinctions of ecosystem management is the emphasis on retaining and maintaining the functions and processes that keep the natural environment resilient to natural disturbances (i.e., fire, wind-throw, and insect/disease infestation) and human-caused disturbances implemented as vegetation management tools (i.e., prescribed fire, thinning, timber harvest, and grazing).

Public concerns, in conjunction with this issue, stem from the debate over how to viably maintain the health and productivity of the ecosystem with respect to its vegetation structure and composition. This is a difficult issue when combined with the requirement that the Forest Service achieve the mandate of multiple uses, attempting to balance human needs and values with the ecological aspects of the ecosystem. Historically, this has often involved suppression of natural wildfire in an effort to preserve the public's scenic, recreation, and economic values for the Forest.

GENERAL RESOURCE CONDITIONS

Vegetation

In 1997, the condition of the Forest's ecosystem was assessed using a Properly Functioning Condition (PFC) process developed by the USDA-Forest Service, Intermountain Region. Resource specialists and forest managers used four criteria (species compositions, structure, patterns, and disturbance regimes) to assess ecosystem conditions at a subregional level. The PFC assessment identified four vegetation cover types that are at a high departure from their historic range of variability: Engelmann spruce/subalpine fir, aspen, juniper, and tall forbs.

Forest vegetation atlases from the early 1900s suggest the timbered component on the forest landscape was in an earlier successional state as evidenced by the broad distribution of

quaking aspen, a disturbance-maintained species. Current vegetation mapping indicates that portions of the forest, which were once dominated by aspen, have succeeded to conifer species. This change has modified habitat patterns and vegetation distribution on the landscape. While these changes in vegetation patterns and composition have benefited some wildlife species, in other cases they have been detrimental. Forest management, including road construction, timber harvest, mining, and utility corridors, has fragmented wildlife habitats and displaced wildlife. Some species of wildlife are sensitive to human activities during portions of their life cycles. These human activities, whether intentional or not, can increase stress to wildlife, increase risk of mortality or result in displacement to suboptimal habitat.

- **Aspen** - Approximately 40-50 percent of the aspen acres on the forest have succeeded to other vegetation types and have been lost from historic landscape scale patterns. The loss of aspen is primarily due to the lack of disturbances that favor aspen, conifer succession, and grazing. Neither fire nor previous treatments have maintained historic aspen-dominated acreage at the landscape and larger scale, as the successional path has led to conifer vegetation. In these early seral stands, the tree canopy may consist almost exclusively of aspen for 50 – 150 years until the slower-growing conifers are able to penetrate the aspen canopy (USDA-FS, 1985, pg. 46). As aspen sites succeed to conifer, due to lack of periodic disturbance, the surface soil layer may change to a more acidic layer that favors conifer regeneration and inhibits aspen regeneration. Many aspen stands are currently experiencing conifer succession. A need exists to convert some conifer with an aspen component to early successional status to meet wildlife habitat needs into the future and to reestablish this cover type on the landscape.
- **Conifer** - Approximately 70-80 percent of the conifer component on the Forest exhibits some mature and old structural attributes, suggesting the conifer structural composition is skewed to older age classes. Conversely, a minor component of the conifer on the Forest is in an early seral status. In order to sustain a mosaic of forest structural classes, proposed management would introduce disturbance that would increase the amount of early- and mid- seral stages to improve biological diversity.
- **Rangelands** - Mountain brush habitats are declining due to advanced seral composition and encroachment of juniper. Sagebrush and mountain mahogany are also tending toward late-seral conditions. If allowed to continue, the carrying capacity for wintering big game and nesting habitat for avian species will decrease. Management needs to focus on creating a better balance of early- and mid-seral stages.
- **Noxious Weeds** - Monitoring reports for the Forest describe a growing concern for the spread and effects of noxious weeds as they are out-pacing containment and control efforts.

Fire Management

Historically, approximately two to four percent of the Forest would have burned annually (22,000 to 44,000 acres annually). Past management practices, including fire suppression, have decreased the annually burned Forest area to substantially less than one percent. Fire

suppression has resulted in a variety of problems including: overly dense stands crowded with vegetation that would normally be thinned by natural fire; increased vulnerability of vegetation to insect/disease infestation; and inadequate regeneration of certain species. In addition, increased vegetative fuel loads can cause uncharacteristic wildland fires that can degrade air quality and watershed conditions, as well as threaten public safety and private property.

PUBLIC CONCERNS

Maintain/Increase Human-Caused Disturbances for Vegetation Structure/ Composition Management

- Several areas of vegetation are at abnormally high density levels as the result of increasing age and lack of disturbance, which places them in a weakened condition for recovering from disturbances. These areas should be treated to reduce fuel loads. If they are left to wait for natural processes, it is likely that uncharacteristic wildland fire and/or epidemic infestation will affect the ecosystem.
- Catastrophic events result in significant losses of biodiversity and require long recovery periods. Responsible management methods, such as prescribed/natural fire, timber harvest, thinning, and grazing should be used to reduce dangerous fuel loads.
- Old growth timber can be managed in well-distributed patches across the landscape for wildlife habitat, while human-caused disturbances are used to reduce fuels loads in order to protect these stands from "hot" (high intensity) fires.
- Vegetation treatments, such as timber harvest and prescribed fire, should be implemented to remove succeeding subalpine fir and Douglas fir from aspen stands, in order to improve this historically critical wildlife habitat.
- Human-caused management methods should be employed to increase grasses/forbs in the understory and to rejuvenate shrub communities, in order to improve the habitat conditions for wildlife (especially sagebrush-dependent species).

Prohibit/Limit Human-Caused Disturbances for Vegetation Structure/Composition Management

- Forest vegetation structure and composition should not be intensively managed as they are not at dangerously, dense levels.
- All human-caused disturbances should be prohibited because they have negative impacts on the ecosystem. Natural disturbances should be the only Forest management methods allowed.
- Old growth timber should be undisturbed as it is important wildlife habitat.
- Human-caused disturbances can have a variety of impacts on the environment that they are attempting to manage. Prescribed fire is less invasive and should be the only human-caused disturbance used to manage Forest resources.
- Demonstration sites should be devised for experimentation and quantitative monitoring of adaptive vegetation management to determine the most effective and least destructive procedures.

- Timber harvest is a consumptive, invasive management tool that should only be implemented in areas of disease/insect infestation or heavy wind-throw for the purpose of circumventing the initiation or perpetuation of insect and/or disease problems.
- Grazing should be limited and regulations strictly enforced as overuse leads to reductions in native vegetation species and increases in non-native or undesirable species (i.e., noxious weeds).

Needs for Change

- Develop or improve management direction for desired vegetation structure, composition, disturbance, and patterns for each cover type that could include restoring more natural fire regimes through prescribed burning or allowing fires to burn under appropriate conditions, harvest, or thinning of dense stands to reduce ladder fuels
- Develop management direction for soil restoration, reclamation, and protection to maintain soil quality, productivity, hydrologic function, and watershed condition
- Develop improved multi-program goals, objectives, standards and guidelines, and monitoring for the prevention, containment, and control of noxious weeds.
- Develop improved multi-program goals, objectives, standards and guidelines, and monitoring to integrate managed fire into Forest-wide desired conditions and to reduce the risk of uncharacteristic fires.
- Develop goals, objectives, standards and guidelines, and monitoring requirements for air quality and smoke management
- Develop direction to restore vegetation health in the wildland/urban interface, such as the lands surrounding Pocatello, to reduce the risk of catastrophic events to landowners.
- Bring all eight Research Natural Areas (RNAs) under consistent management direction, including the use of prescribed fire and naturally occurring fire to maintain the objectives of RNAs where appropriate.
- Develop guidelines for the removal of undesirable noxious or invasive plant or animal life from wild and scenic rivers, recommended wilderness and other unique ecosystems.

Indicators

EM 1 Insect hazard rating—a relative rating with a range of low, low-moderate, moderate, moderate-high, or high.

EM 2 Wildfire hazard rating for forested and non-forested vegetation using a relative rating with a range of low, low-moderate, moderate, moderate-high, or high.

EM 3 Fire condition class – a relative rating of the potential for uncharacteristically large wildfires with a range of low, low-moderate, moderate, moderate-high, and high

EM 4 Percent of conifer and aspen acres in mature and old condition class in Year 100.

EM 5 Percent of conifer and aspen acres in mature and old condition class in Year 10.

EM 6 Number of decades to reach the desired range of future conditions by forested vegetation type.

EM 7 Percent of non-forested acres in greater than fifteen percent canopy cover density condition class in year 10 and long-term compared to historic range of variability (HRV).

EM 8 Number of decades to reach the historic range of variability in non-forested vegetation types.

ISSUE 4 - LIVESTOCK GRAZING

Grazing of public lands is an issue that has increased in complexity as the lifestyles, and subsequently, the interests of society have evolved. There has been an increase in concern for the health and productivity of Forest habitats, and some may consider these concerns to be more important than historic commodity driven goals (such as grazing). However, grazing permits play a traditional and vital role in local agriculture. Many local operations rely on forage produced on public lands to meet a portion of their yearly grazing needs. Forest management direction affects rangeland resources and the level of livestock grazing authorized under permit.

General Resource Conditions

The 1985 Forest Plan identified approximately 700,000 Forest acres as capable of supporting livestock grazing. However, the Forest Service and the public have determined that a suitability analysis for livestock grazing should be completed at the Forest-wide scale. Actual average livestock use levels, defined in animal unit months per year (AUM/yr), are lower than originally anticipated in the current Forest Plan. Contributing factors to this downward trend include; increased importance of National Forest fish and wildlife habitats; increased livestock operator costs due to mitigation measures identified to protect these habitats; changing economics of grazing livestock; and increased varieties and use of recreation opportunities.

Public Concerns

Maintain Livestock Grazing on the Forest

- Livestock grazing is a necessary economic factor for many residents within the Forest zone of influence. Their livelihood will be directly and significantly affected if grazing privileges are diminished or rescinded.
- Grazing is a historical factor for many members of the local community whose quality of life and lifestyle, will be negatively affected if grazing privileges are diminished or rescinded.
- Livestock grazing can be an effective tool to manage vegetation and improve resource conditions to meet a variety of management objectives.

Eliminate or Limit Livestock Grazing on the Forest

- Livestock grazing on public lands should be prohibited because of significant damage to upland, riparian, and aquatic resources that result from the practice.
- Livestock grazing should be prohibited on national forest lands due to the negative impacts it has on recreation sites and experiences. At the very least, livestock should not be permitted on or near developed recreational facilities or undeveloped sites that are heavily used.
- Livestock grazing removes vegetation from, and encroaches on, the habitat of native Forest species.
- If use is continued, impacts from grazing should be reduced by setting, monitoring, and enforcing Forest-wide standards and guidelines for forage utilization/stubble height, percent use of woody species, soil compaction, and stream bank damage.
- The Revised Forest Plan should delineate areas where livestock grazing is allowed and not allowed based on a set of objective land capability and suitability criteria.

Needs for Change

- Evaluate rangeland capability information and reassess areas suitable for livestock grazing through the application of prescriptions in a range of Alternatives.
- Develop standards and guidelines, including forage utilization for native range and seedings, to protect vegetation diversity and structure, soil productivity, fish and wildlife needs, and ecosystem processes, especially watershed functions.
- Develop and implement protocols for monitoring grazing standards on the Forest.

Indicators

LG 1 Estimated suitable rangeland acres on the Forest.

LG 2 Potential forage production on suitable range.

LG 3 Change in actual use based on current management.

LG 4 Upland vegetation response to grazing.

ISSUE 5 – MINERALS OPERATIONS, RECLAMATION, AND HAZARDOUS SUBSTANCES MANAGEMENT

Phosphate is by far the largest mineral resource currently being mined on the Forest. There are five Known Phosphate Leasing Areas (KPLAs) that lie, at least partially, within the Forest boundaries. There is also potential for productive oil/gas wells although no lease applications have been issued or are pending. Mining of locatable minerals such as gold, perlite or pumice occurs, though use of these resources is not expected to be high (FEIS, Chapter 3: Issue 5).

Issues concerning mining have changed since the Forest Plan was originally composed and these variations have prompted a concern and need for new directives in the Revised Forest Plan. Some of the changes are: a public desire for, and emphasis on, more natural appearing reclaimed landscapes; the discovery that selenium and possibly other hazardous substances are leaching from phosphate mines; and the fact that regulations concerning the leasing of National Forest lands for oil and gas development have changed. The Revision will not address oil and gas leasing, this would be analyzed in a separate environmental analysis, when needed.

General Resource Conditions

Reclamation activities occur on mining sites, mine waste dumps, and haul roads. Past reclamation efforts have not focused on the establishment of native plant species and their associated communities and structure. Current reclamation activities on mine sites require topsoil stripping, which is then directly replaced rather than stockpiled, if possible. Native plant species are now being used for reclamation where they will accomplish the objectives. Some of the reclaimed sites have experienced instability in the form of slumps and debris flows (sometimes causing sedimentation in waterways). In 1996, the Forest Service and Bureau of Land Management became aware that phosphate mining-related disturbances might be releasing selenium into the ecosystem at unacceptable levels. Preliminary data from a comprehensive study conducted in 1998 indicated elevated selenium levels could be a major issue that will require a concerted effort on the part of federal/state agencies, research, and mining industry experts to resolve.

Public Concerns

Maintain Current Mining Standards and Management Directions

- Public lands have traditionally been used for mining activity and current standards and management directions are adequate.

Revise Current Mining Standards and Management Directions

- Additional standards/guidelines must be developed, implemented, and enforced in order to significantly minimize or eliminate the potential release of hazardous substances (including selenium) from mining activities.
- The scenic/recreational qualities, other public uses and biodiversity of a given habitat should be deemed highly valuable and therefore sought after, and provided for, in reclamation efforts.
- Stricter standards/guidelines should ensure effective topsoil management, use of native plant species, construction of more natural appearing landscapes, as well as the use of Best Management Practices.
- Monitoring and enforcement are essential to ensure that new standards/guidelines are effectively met, in order to circumvent the continuance of hazardous and detrimental practices.

NEEDS FOR CHANGE

- Develop improved goals, objectives, standards and guidelines to address reclamation of lands after phosphate mining, including the use of native plants, the use of resident topsoil, and the restoration of a more natural appearing landscape in reclamation efforts.
- Incorporate new Best Management Practices (BMPs) or other new information as it is developed or becomes available to address selenium releases into the environment.

INDICATORS

No comprehensive issue indicators exist for this issue. However, the direction of mineral reclamation is either from a prescriptive or an adaptive management approach (FEIS, Chapter 4, Issue 5).

ISSUE 6 - RIPARIAN/WETLAND AREAS AND AQUATIC BIOTA

Riparian areas include banks and adjacent areas of water bodies that have considerably moister soils than contiguous floodplains and uplands. Wetlands have more available water for longer periods of time than riparian areas, making them only slightly different. These areas are vital because they provide specialized wildlife habitat and their localized vegetation notably contributes to stream bank and floodplain stability as well as water temperature and quality.

GENERAL RESOURCE CONDITIONS

Approximately ten percent of the Forest's riparian areas are considered to be functioning improperly and about thirty-five percent of the Forest's streams are considered moderately at

risk. The State of Idaho, through the Environmental Protection Agency, under section 303(d) of the Clean Water Act, has identified twenty-one waterbodies within the Forest that may not fully meet their designated beneficial uses. Improved management direction is needed to maintain or restore riparian vegetation, channel stability/function, and aquatic resources.

Yellowstone and Bonneville cutthroat trout, Forest Service Sensitive species have been inventoried on the Caribou side of the Forest between 2000 and 2002. Of the 51 sixth code Hydrologic Units in which Yellowstone cutthroat trout were expected to occupy, 67 percent had strong populations, 27 percent had depressed populations, and 6 percent had no Yellowstone cutthroat trout. Of the 35 sixth code Hydrologic Units in which Bonneville cutthroat trout were expected to occupy, 17 percent had strong populations, 43 percent were depressed, and 40 percent had no Bonneville cutthroat trout.

PUBLIC CONCERNS

Emphasize Multiple-Use for Management of Riparian Areas

- Riparian areas are historically significant for recreational, grazing, mining and varied uses demanded by the public and should be managed with multiple-use directives in order to meet societal demands.

Emphasize Restoration and Protection for Management of Riparian Areas

- Restoration should be emphasized in order to promote function of riparian areas to meet state and federal standards for clean water.
- It is vital to retain the integrity of riparian areas as they provide significant physical, biological, and chemical attributes that directly influence the quantity and quality of water and aquatic biota.
- Sufficient habitat conditions must be maintained in order to sustain viable populations of wildlife and fish species, such as the Bonneville and Yellowstone cutthroat trout.
- Minimally disturbed areas (i.e. roadless areas) should be conserved as strongholds for riparian values, aquatic habitat, and clean water.

NEEDS FOR CHANGE

- Develop goals, objectives, standards and guidelines, and monitoring strategies for riparian and aquatic management.
- Develop appropriate desired future conditions that reflect the inherent diversity and capability of the Forest's riparian and aquatic ecosystems and fully support the designated beneficial uses of the water in accordance with State Water Quality Standards and the Clean Water Act.
- Develop management direction that emphasizes native fish habitat protection and population viability.
- Develop or improve management direction for Sensitive Species and species listed under the Endangered Species Act.

- Maintain or enhance the "outstandingly remarkable" ecological value of Elk Valley Marsh and the "outstandingly remarkable" fisheries value for St. Charles Creek by incorporating appropriate management direction in the Revised Forest Plan.

INDICATORS

R 1 Watershed integrity as defined in the Inland West Watershed Initiative (IWWI) and measured by percent of watersheds disturbed by alternative.

R 2 Riparian condition measured as relative protection by alternative.

R 3 Water quality measured as relative protection by alternative.

R 4 Fish population viability based on probability of persistence over the long term, using a rating of "low persistence," "moderate persistence," or "high persistence."

ISSUE 7 - TIMBER SALE PROGRAM

The National Forest Management Act directs the Forest Service to program timber harvest on a non-declining yield basis. This means the timber sales offered should not exceed the quantity which the Forest is capable of naturally producing on a sustained-yield basis. Three Idaho mills currently purchase commercial wood products from the Caribou National Forest: Stoddard Lumber Company in St. Anthony, Yellowstone Log Homes in Rigby; and Jensen Lumber Company in Ovid. Two other commercial buyers, Mountain Valley Timber Co. and Louisiana Pacific Corporation, have been active recently in purchasing timber from the Forest. Demand for commercial wood products, including sawtimber, remains at eleven million board feet (MMBF) a year.

GENERAL RESOURCE CONDITIONS

Approximately 550,000 acres of the Forest support forestland. (This excludes about 10,200 acres of lands where forested vegetation species are gradually encroaching into shrub habitats.) The Forest provides a variety of wood and miscellaneous products (sawtimber, house logs, chips, firewood, Christmas trees, posts and poles). These products supply commodities to the public, provide revenue to the government, and generate income and jobs for local and regional economies.

Public Concerns

Maintain a Supply and Demand Level of Timber Harvest

- Several community members rely on the traditional availability of fuel wood as an economically necessary heating method.
- It is important to maintain sustainable sawtimber harvests, as economies are dependent on the supply. Three mills operate within the area, and two other commercial buyers are active in purchasing timber from the Forest. Demand, including sawtimber, is at least eleven million board feet per year.
- Timber harvest is an effective vegetation management tool for: controlling conifer encroachment in aspen stands; wildland fire, fuels reduction; and salvage of windfall or infested timber for the purpose of circumventing the initiation or perpetuation of detrimental insect and/or disease infestations.

Restrict/Prohibit Timber Harvest

- Timber harvest can have serious/detrimental effects on aquatic, terrestrial, and hydrologic integrities. Thus, it should be prohibited until the suitability of an area is determined. Then harvest should be restricted to (and enforced for) sustainable levels, and mitigations (as well as Best Management Practices) should be developed and enforced in order to effectively protect aquatic, terrestrial, and hydrologic integrities.
- Timber harvest should be prohibited or severely restricted in roadless areas in order to retain healthy natural habitats as well as the scenic qualities that primitive recreationists seek.
- All harvest activities should be prohibited in watersheds that contain water quality limited streams in an effort to restore/rehabilitate these areas that were probably compromised in the first place by human-caused disturbances.

Needs for Change

- Reassess timberland suitability and develop direction for management of suitable acres for ecological and multiple use purposes.
- Develop or improve management direction for desired vegetation structure, composition, disturbance, and patterns for each cover type.

Indicators

T 1 <u>Allowable Sale Quantity</u>: The maximum quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for the first decade. The ASQ volume calculated is the amount of timber that is available on a continuous or sustainable basis from the suited timberland based on the current conditions of suited timberland acres and timber inventory.

T 2 <u>Total Sale Program Quantity</u>: The total amount of timber and other wood products that could be produced by each Alternative for the first decade. This indicator

includes all of the ASQ volume and an additional volume of wood products (fuelwood, post, poles) that may come from both suited and unsuited timberlands.

T 3 Acres harvested (Decade total).

T 4 Suitable acres.

T 5 Acres of suitable timber in Roadless Areas

T 6 Estimated total miles of road construction and reconstruction.

ISSUE 8 - ROADLESS AREA MANAGEMENT AND RECOMMENDED WILDERNESS

The Forest Service can recommend areas for wilderness through the forest plan process, but only Congress, through the legislative process, can determine areas for inclusion into the Wilderness Preservation System. Congress also has the authority to change USFS recommended wilderness boundaries. Although Idaho has approximately 4,006,000 acres of designated wilderness, none of those areas lie within the Caribou National Forest. The current Forest Plan recommended a 14,600-acre section of the Mt. Naomi Roadless Area and a 16,000-acre section of the Worm Creek Roadless Area to Congress, in 1985, for wilderness designations; to date, Congress has not acted on these recommendations. Public concern for wilderness and roadless areas appears to stem from a desire for additional designations versus concerns about the implications these designations may have on Forest access.

GENERAL RESOURCE CONDITIONS

Over 70 percent of the Caribou is within an Inventoried Roadless Area (IRA). Thirty-four IRAs encompass over 700,000 acres. Several of these IRAs have been entered for timber harvest, mining, and road building since the 1985 Plan was signed. The AMS proposed to carry the 1985 Forest Plan wilderness recommendations for the Mt. Naomi and Worm Creek roadless areas forward as a component of all Revised Forest Plan alternatives.

PUBLIC CONCERNS

Decrease Wilderness Recommendations and Maintain/Increase Motorized Access in Roadless Areas

- There are several thousand acres of wilderness acreage in Idaho and surrounding states. There is no need to limit multiple-use opportunities on the Caribou by designating additional wilderness.
- Wilderness designation decreases motorized access to the Forest and limits recreational opportunities, especially for disabled Americans, and negatively impacts important traditional and/or economic resource use.
- Roadless areas should not be increased nor should semi-primitive, non-motorized prescriptions. There is a substantial demand for recreation as well as managed

resource use that requires motorized vehicles. The public's recreation and resource needs should be balanced with environmental needs not subjugated to them.

Increase Wilderness Recommendations and Decrease Motorized Access in Roadless Areas

- All thirty-four roadless areas, or at least those with high wilderness capability and availability, should be recommended for wilderness designations.
- Roadless areas not recommended for wilderness designation should be managed as semi-primitive, non-motorized in order to retain healthy natural habitats as well as the scenic qualities that primitive recreationists seek.
- Roadless areas not recommended for wilderness designation should (at the very least) be managed as semi-primitive, motorized.

NEEDS FOR CHANGE

- Re-evaluate the Forest's thirty-four inventoried roadless areas for possible Wilderness recommendation.
- Establish management direction for roadless areas considering the various values associated with roadless areas.

INDICATORS

RA 1 Acres in management prescription categories 1, 2, and 3.

RA 2 Projected acres harvested in Inventoried Roadless Areas (IRAs).

WD 1 Acres recommended to Congress for inclusion in the Wilderness Preservation System.

WD 2 Non-motorized opportunity within recommended Wilderness.

WD 3 Motorized opportunity within recommended Wilderness.

ISSUE 9 – WILDLIFE HABITAT MANAGEMENT

A variety of diverse habitats exist for approximately 334 species of terrestrial vertebrate wildlife known or suspected to occur on the Forest. These habitats provide cover, forage, water, and reproductive sites for these species. The National Forest Management Act (NFMA) 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." Public concern regarding this issue is in relation to the various potentials for wildlife habitats to be altered by management directions made in the Forest planning process.

Rangelands

A wide variety of wildlife species rely on rangeland cover types including native grouse, raptors, small mammals, migratory birds, and big game. The cumulative impact of domestic livestock grazing and big game foraging has the potential to adversely affect vegetation and watershed conditions and /or degrade big game winter range. In addition to the increase of elk populations, and the subsequent pioneering of new winter range, the recent construction of new homes and developments have displaced big game from traditional, privately owned, winter range. Thus, the wildlife habitat value of the remaining winter range, public and private, has increased.

Lack of fire has caused a trend to late seral overstories and grazing has generally maintained understories in early to mid-seral stages (Planning File, Livestock Grazing). Past seedings for forage improvement for livestock grazing have changed at least 63,000 acres to partially, non-native understories that include introduced grass species such as crested wheatgrass, bulbous bluegrass, Kentucky bluegrass and smooth brome (Planning File, Livestock Grazing).

Riparian Habitats

About eighty-three percent of wildlife species (85 percent of which are birds) on the Caribou National Forest are dependent on riparian areas. There is a decline in amphibian species, which locally mirrors observed declines in portions of the Rocky Mountain region. The factors that are contributing to these declines are unknown at this time. However, approximately 10 percent of the Forest's riparian areas are functioning improperly and 35 percent are moderately at risk.

Forested Habitats

There are eight sensitive species associated with forested habitats that may be present on the Caribou. In general, the increase of motorized access into the remote areas of the Forest is impacting wildlife security. As with other forested areas in the West, timber stands are trending toward older age classes. To improve overall habitat diversity, management actions should focus on increasing the amount of early and mid-seral stands of forested vegetation.

Threatened, Endangered, and Sensitive Wildlife/Plant Species

The Forest contains potential habitat for the federally listed, Threatened, Ute ladies'-tresses. If it is found, measures would need to be taken to meet Endangered Species Act obligations.

The Forest contains habitat for several Forest Service Sensitive species: four plants associated with rangeland communities; two animal species associated with rangeland communities: eight animal species associated with forested communities: and five animal species are associated with riparian/wetland/aquatic communities. There are also five listed Threatened or Endangered species known or suspected to be on the Forest. (FEIS, Chapter 3: Wildlife Habitat.)

Public Concerns

Maintain Current Wildlife Habitat Management Efforts

- The Forest is adequately balancing the habitat needs of threatened, endangered, and sensitive species with multiple-use directives.
- The Forest is adequately balancing the habitat needs of threatened, endangered, and sensitive species with societal demands for public resources on the Caribou National Forest.

Increase/Revise Wildlife Habitat Management Efforts

- Summer and winter big game habitats should be protected and managed to provide for huntable populations of these species.
- Motorized activities such as timber harvest, road building, OHV use, and mining adversely impact species populations and management directions should be implemented to decrease their use and impacts.
- Protective measures should be implemented, monitored, and enforced to manage habitats in order to rehabilitate/maintain viable populations of federally listed and or sensitive species.
- Habitat sanctuary preserves, core reserves, and biological corridors should be established in order to protect wildlife populations from current multiple-use activities.

Needs for Change

- Develop management direction to maintain a percentage of old growth on an area of land base in the Revised Forest Plan.
- Develop management direction for increasingly important habitats, such as winter range, to maintain habitat vegetation and watershed values.
- Develop standards and guidelines for riparian and wetland areas to meet the requirements of wildlife species associated with these unique and valuable habitats.
- Develop management direction, including monitoring of habitat trends, to conserve or restore key wildlife, fish, and rare plant habitats, including those species federally listed under the Endangered Species Act, species identified as Sensitive by the Regional Forester, and species identified as rare or scarce.
- Develop management direction for Sensitive Species and species needing extra consideration to ensure the Forest contributes to the maintenance of viable populations and to ensure these populations do not trend towards listing under the Endangered Species Act.
- Develop management direction to address habitat loss from disturbance, succession, or human encroachment and its replacement through succession or active management.
- Develop management direction to maintain or improve habitat connectivity and manage terrestrial and aquatic habitats, including habitats for broad-ranging species such as deer, elk, wolverine and lynx.

INDICATORS

WL 1 Viability analysis based on wildlife habitat outcomes (and population data where available) for each Alternative. Viability analysis will incorporate "guilds" or "suites" of species that use or need similar habitat conditions. Viability is expressed in "low risk" and "moderate risk" terms. "Low risk" means the Alternative provides a high likelihood of species persistence. A "moderate risk" means the Alternative provides a moderate likelihood of species persistence.

- Forest vegetation associated species
- Rangeland vegetation associated species
- Riparian vegetation associated species

WL 2 Determine how habitats contribute toward state game population management goals and objectives using qualitative "meets" and "does not meet" ratings.

- Summer habitat effectiveness
- Hunting season vulnerability
- Acres managed for winter range

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Final Environmental Impact Statement

Caribou Revised Forest Plan
Chapter Two--Alternatives

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Chapter 2

Alternatives

Alternatives, including the Proposed Action

According to the National Environmental Policy Act (NEPA), Chapter 2 – Alternatives – is at the heart of the process. This chapter contains a detailed description of the Proposed Action and the Alternatives to the Proposed Action, including the No Action Alternative. Explanations are provided about how the Interdisciplinary Team (IDT) developed the alternatives and describes why some were considered but eliminated from detailed study. At the end of this Chapter, a summary table compares the major features and effects of each Alternative.

Maps and other illustrations used throughout this Environmental Impact Statement (EIS) are graphic designs that explain or show relationships rather than true on-the-ground representation. Larger, more detailed maps are available for review in the Headquarters Office, Caribou-Targhee National Forest, Idaho Falls, Idaho. Acre figures throughout this document are approximations and vary due to mathematical rounding.

CHANGES MADE BETWEEN DRAFT EIS AND FINAL EIS

Major changes between the Draft EIS and the Final EIS include the creation and analysis of a new alternative, Alternative 7R, based on comments received on the Draft EIS and changing direction on inventoried roadless area management. The alternative was developed using other components of other alternatives presented in the Draft EIS. These changes required some adjustment to management prescriptions for this alternative.

Several major issue sections were updated with additional analysis including livestock grazing, ecosystem management disturbance, recreation and access, recommended wilderness and roadless management. In addition, changes were made to several issue indicators to reflect the scope and scale of analysis in Chapter 4.

This Final EIS also contains new or updated appendices, including Appendix A, Public Involvement, Appendix B, Analysis Process, Appendix C, Wilderness Recommendations, Appendix D, Wildlife, TES Plants, and Fish Viability, and a new Appendix R, Roadless Areas.

Major and minor editorial changes were also made throughout the document, based on public comments or new information available between the release of the Draft EIS and the Final EIS.

PROCESS USED TO FORMULATE ALTERNATIVES

Alternatives under consideration were developed from the following sources:

- Monitoring and evaluation of current Forest resources
- A review of procedure and guidance from existing legislation and regulations, including the Code of Federal Regulations [CFR 219], the National Forest Management Act, and Forest Service Manual policy and direction
- A review of current management direction in the 1985 ***Caribou National Forest and Curlew National Grassland Land and Resource Management Plan***
- An assessment of existing conditions, disclosed in the ***Initial Analysis of the Management Situation (AMS) for the Caribou National Forest*** dated April 1999 and subsequent public comments
- Issues identified during the public scoping process as a result of the release of the AMS in April 1999; the Notice of Intent and Scoping Statement released August 9, 1999; and comments received at public meetings held in December 1999 and November 2000
- Management concerns and opportunities identified by the Interdisciplinary Team, including a review with the Intermountain Regional Office in Ogden, Utah

Nine significant planning issues were identified through these efforts: Access Management; Economics; Ecosystem Management; Livestock Grazing; Minerals Operations, Reclamation and Hazardous Substances Management; Riparian/Wetland Areas, Aquatic Habitat and Water Quality Management; Timber Sale Program; Recommended Wilderness and Roadless Area Management; and Wildlife and Habitat Management. These issues were used to develop a range of Alternatives to the proposed action as described in the Notice of Intent, dated August 9, 1999.

Fourteen preliminary Alternatives were initially identified, including the No Action and the Proposed Action. Seven of these preliminary Alternatives were eliminated from further analysis. The remaining seven were displayed and the effects analyzed in the Draft EIS. In response to public comments on the DEIS, the Forest developed another alternative, Alternative 7R. Thus, fifteen alternatives have been identified during the process. (See "Alternatives Considered but Eliminated from Detailed Study" for a discussion of these.)

ELEMENTS COMMON TO ALL ALTERNATIVES

Each of the final eight Alternatives has identical or similar features to the others, and certain portions of a revised management plan would be the same for all Alternatives. In many other respects, the Alternatives are distinctly different from each other, especially in how they address the management concerns and issues generated through the formal public scoping process. Each

Alternative is, in effect, a blueprint for a stand-alone management plan, which, if chosen, would guide management of the Caribou for the next ten to fifteen years.

It was the intent to make all of the Alternatives considered in detail meet the purpose and need of this revision effort and to be fully implementable and achievable, subject to budget allocations. All of the Alternatives represent the principles of multiple use and sustained yield management, maintain or improve ecosystem health, and comply with environmental laws, although they may do so in slightly different ways. While all the Alternatives provide a wide range of multiple uses, goods, and services, some Alternatives give more or less emphasis to particular ones.

Historically, the Forest Service has not received the funds necessary to fully implement its management plans. Budgets were allocated based on the emphasis in the Alternative, the expected goods and services provided, and the necessary actions and expenditures required to deliver those goods and services.

Management objectives in each Alternative rely on adequate funding over the plan period and are subject to fluctuating budget levels, policy, and legislative decisions. The FY 2000 budget was used as a basis for developing Alternative budgets. Budgetary costs fluctuated between Alternatives depending upon the level of management activities. For example, those Alternatives with high vegetation treatment acres had higher costs for vegetation treatment than those Alternatives characterized by lower levels of treatment. Regarding the level of Congressional funding, if budget appropriations are less than the projected costs of management activities within an Alternative, the level of management activities correspondingly would be reduced. As a result, it will take longer to achieve desired outcomes associated with the Alternative.

All Alternatives use a consistent numbering scheme, provide basic protection for Forest resources, and comply with environmental laws. A consistent mapping approach is used in each Alternative using management area prescriptions. These prescriptions fall into broad categories called **Management Area Categories.**

> **Category 1** prescriptions are applied on lands that include Wilderness and backcountry areas where ecological processes, such as fire, insects and disease, are essentially allowed to operate relatively free from the influence of humans. Few, if any, man-made facilities are present. Travel is non-motorized with rare exceptions.
>
> **Category 2** prescriptions are applied on lands that provide for conservation of representative or particular rare and narrowly distributed ecological settings or components, such as riparian areas, wetlands, research natural areas or other special designated areas. These lands help insure conservation of ecosystems or ecosystem components that may provide important functions which insure the overall sustainability of larger landscapes. Human influences on ecological processes are limited to the degree possible but are sometimes evident. Human uses vary, but they are generally non-intensive.
>
> **Category 3** prescriptions are applied on lands that provide for a balance between ecological values and human uses. Resource management activities may occur, but

natural ecological processes and resulting patterns will normally dominate the landscape. Although these land areas are characterized by natural appearing landscapes, an array of management tools can be used to restore or maintain relatively natural patterns of ecological processes. Lands in this prescription category show some evidence of human activities and uses, including vegetation manipulation activities. Restrictions on motorized travel can vary by area and season.

Lands where **Category 4** prescriptions are applied provide for the management of ecological values to provide human recreational uses, such as developed and dispersed recreation areas. Recreation uses are within levels necessary to maintain overall ecological systems. Resource uses for other values generally are not emphasized and have little impact on ecological structure, function or composition. Sights and sounds of humans, on site, can be expected and even desired. Motorized transportation is common.

Category 5 prescriptions are applied on lands that are generally forested ecosystems and are managed to meet a variety of ecological and human needs. Timber harvest on lands under this prescription counts toward the ASQ. Ecological conditions are maintained with an emphasis on selected biological structures and compositions that consider the range of natural variability. These lands often display high levels of investment, use and/or activity, density of facilities, and evidence of vegetation manipulation activities. Facilities that support various resource uses are common. Motorized transportation is common, but some seasonal restrictions may occur.

Lands where **Category 6** prescriptions are applied are primarily non-forested ecosystems that are managed to meet a variety of ecological and human needs. Ecological conditions are maintained with an emphasis on selected biological structures and compositions that consider the range of natural variability. These lands may display high levels of investment, use and/or activity, and evidence of vegetation manipulation activities. Facilities that support various resource uses are common. Both motorized and non-motorized transportation is common.

Lands where **Category 8** prescriptions are applied are likely to be permanently altered by human activities beyond the level needed to maintain natural appearing landscapes and ecological processes. These land areas are generally small. Ecological values are protected where they affect the health and welfare of human occupancy. Mines, utility corridors or other concentrated uses are included in this prescription category. Human activities are generally commercial in nature and directly or indirectly provide jobs and incomes. Motorized transportation is common.

As directed by federal law, Forest Service policy, regulations, and guidance described in the Regional Guide for the Intermountain Region, **all Alternatives** will:

- Maintain basic soil, air, water, and land resources.
- Meet state and federal water quality standards.

- Provide a variety of life through management of biologically diverse ecosystems, though they may differ in how they emphasize native plant and animal management.

- Provide recreation opportunities and maintain scenic quality in response to the needs of National Forest users and local communities.

- Protect heritage resources in accordance with applicable laws and regulations, while also providing recreational and educational opportunities.

- Manage and protect fossils and antiquity resources.

- Suppress all wildfires that pose a threat to private property and public safety.

- Treat noxious weeds as described in the 1996 Forest-wide Noxious Weed EA.

- Sustain multiple uses, products, and services in environmentally acceptable manners.

- Update resource direction identified in the ***Initial Analysis of the Management Situation for the Caribou National Forest (AMS)*** that does not need to change in accordance with existing laws, regulations, and Forest Service Manual direction. (See AMS, pages 1-16 to 1-19.)

- Place emphasis on improved landownership and access patterns that benefit both private landowners and the public through cooperation with other landowners.

- Improve financial efficiency for most programs and projects by minimizing expenses, recognizing, that not all programs and projects produce revenue or are above cost.

- Emphasize cooperation with individuals, organizations, and other agencies to coordinate the planning and implementation of projects.

- Promote rural development opportunities to enrich rural cultural life, to enhance the environment, to provide employment, and to improve rural living conditions.

- Meet Federal Tribal Trust Responsibilities.

- Apply Wild and Scenic River management direction for eligible sites.

- Determine capability and suitability of rangelands to support livestock grazing.

- Determine the tentatively suited timber base on the forest.

- Require site-specific analysis for new Oil & Gas Leasing Proposals. The existing Plan allows leasing to occur; however, new regulations do not allow leasing under the Plan.

- Comply with Montana/Idaho Smoke Management Plan when planning, conducting, and reporting prescribed fires.

- Provide for non-declining, even flow and long-term sustained yield of wood products from lands suited for timber production.

- Provide for watershed health and restoration.

- Implement direction from the National Fire Plan.

ELEMENTS COMMON TO ACTION ALTERNATIVES 4, 5, 6 and 7

IMPLEMENTATION OF ROADLESS AREA CONSERVATION RULE (2000)

Management direction for Inventoried Roadless Areas (IRAs) was analyzed on a national scale through the Roadless Areas Conservation EIS, initiated by the Forest Service in the fall of 1999. In November 2000, the Forest Service issued the FEIS for the Roadless Area Conservation Rule in which the Preferred Alternative prohibited timber harvest and road building in inventoried roadless areas.

On January 12, 2001, the Roadless Area Conservation Rule (RACR) was published in Federal Register (36 CFR 294). The Roadless rule prohibited road construction, reconstruction and cutting, sale and removal of timber, with certain exceptions for the Inventoried Roadless areas identified in the FEIS maps. However, harvest for stewardship reasons could be done. The RACR had an effective date of March 13, 2001. This effective date was later delayed until May 12, 2002.

Later, several groups and States sued the Forest Service, alleging that there had not been adequate public involvement. The Idaho District Court agreed and on May 10 of 2001, the RACR was enjoined, thus was never in effect. Several environmental groups then appealed this decision to the 9th Circuit Court of Appeals. On December 12, 2002, the 9th Circuit Court of Appeals in a split decision reversed the injunction imposed by the lower Court. The Plaintiffs have requested that the entire 9th Circuit panel of judges review the ruling. This request is pending. The injunction is still in place until the 9th Circuit issues a mandate to the lower court to lift the injunction.

Although the RACR was not in effect at the time the Draft EIS was issued, in May of 2001, the preferred alternative in the DEIS, Alternative 7, incorporated the prohibitions of the RACR[1]. A range of alternatives has been developed, some incorporating the Roadless Area Conservation Rule and some not. Each alternative description describes how the rule was addressed for that Alternative. In those alternatives where the RACR was applied, suitable timber acres were reduced in roadless areas because management objectives are not for timber production. However, capable forested acres within roadless areas could be harvested for stewardship purposes consistent with RACR.

[1] At the time the Forest went "to press" with the Draft Plan and DEIS in early April of 2001 it was anticipated that the RACR would be in effect once the documents were distributed to the public.

Alternative Descriptions

This section provides a narrative description, prescription tables, and prescription maps for each Alternative under consideration.

- Alternative 1 is the No Action Alternative required under the National Environmental Policy Act.
- Alternative 2 is the Proposed Action described in the Notice of Intent.
- Alternatives 3 through 7, including 7R, are action Alternatives to the Proposed Action, based on the issues identified through the scoping process discussed in Chapter 1.
- **Alternative 7R is the Selected Alternative.**

ALTERNATIVE 1 - NO ACTION (CURRENT PLAN DIRECTION)

THEME

Alternative 1 proposes to continue management under the existing 1985 Land and Resource Management Plan for the Caribou National Forest unless amended through site-specific project implementation. Analysis of this Alternative is a requirement of the National Environmental Policy Act (NEPA). This Alternative reflects the likely outcomes of managing forest resources under the direction in the current plan into the future.

It includes a crosswalk of current Forest Plan direction, as amended by INFISH, using new management area prescriptions. Management prescription language in the 1985 Forest Plan has been updated to more accurately describe current management direction. In addition, prescriptions have been reclassified into broader Management Area Categories to simplify on-the-ground implementation, to improve consistency and understanding across and between National Forests, and to facilitate broad-scale analysis of issues, such as connectivity of habitat for wildlife. This Alternative addresses economics, commodity timber production, mining, and livestock grazing.

ACCESS AND RECREATION MANAGEMENT

Summer motorized recreation would be managed using open motorized road and trail densities at or near current levels on designated routes. No new motorized roads would be permitted unless an equal length of motorized road is closed elsewhere on the Forest. About 420,200 acres (~ forty percent) open to summer cross-country motorized use would be retained in this Alternative.

The Forest would remain open to winter motorized travel, except in that portion (~14,600 acres) of the Mt. Naomi Roadless Area recommended for Wilderness in the 1985 Forest Plan. Some

areas across the Forest would be seasonally closed for big game winter range or for non-motorized winter recreation, as displayed in the Forest Travel Plan.

Developed and dispersed recreation opportunities would be managed at the current level or increase as resources and budgets allow.

ECONOMICS

In this Alternative, economic outcomes would be the result of managing forest resources to provide sustained yields of timber, wood fiber, and livestock forage, while maintaining site productivity and environmental quality.

ECOSYSTEM MANAGEMENT

Disturbance

Disturbances would not be permitted to operate naturally in order to protect commodity values. Insect and disease disturbances would be suppressed to reduce the risk of these occurrences and stand-replacing wildfires. Wildfires would be suppressed to protect public safety and resource values. Wildland fire use would not be allowed. Prescribed fire would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities.

VEGETATION STRUCTURE AND COMPOSITION

Forested Vegetation

All conifer vegetation types and aspen would be managed to maintain stand vigor, productivity, and resilience to major disturbance events, including stand-replacing fires and epidemic and endemic insect and disease activity. Approximately 10 percent of the forested acres forest-wide would be maintained in an old age structure to provide habitat for old growth dependent species.

Approximately 16,800 acres would be treated over the decade. Treatments would include prescribed fire, thinning, harvesting, or other methods that would achieve resource objectives.

- *Table 2. 1. Alternative 1. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	N/A	550,000	16,800	0	16,800

Non-forested Vegetation

Rangelands, primarily sagebrush and mountain shrub, would be managed to provide a variety of uses, such as forage for livestock grazing, watershed stability, and wildlife habitat. Approximately 13,000 acres would be treated annually, primarily using prescribed fire, to improve wildlife habitat and vegetation condition. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need or to stimulate forage producing plant species in the understory.

Retention and restoration of tall forb sites, where they exist, would be addressed at the site-specific level, based on research findings.

- *Table 2. 3. Alternative 1. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	None Established	None Established	None Established	130,000

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Rangelands would be managed to provide forage for livestock and wildlife while protecting productivity and coordinating with other uses. Non-forested vegetation would be managed to provide high forage production for livestock and wildlife, including seedings of forage-producing plants and the installation of fences and water developments for livestock management systems and practices. No forest-wide upland or riparian livestock utilization levels would be proposed in this Alternative. Utilization rates would continue to be determined at the site-specific level through Allotment Management Planning activities. Current estimated utilization rates are shown below (For additional information see Chapter 4 Livestock Grazing):

Table 2. 5. Alternative 1. Estimated Livestock Utilization Levels by Type of Forage.

Type of Forage	Livestock Utilization Rates[1]
Upland Browse	35%-45%
Upland Herbaceous	50%-60%
Riparian Grazing Standards	Based on site-specific analysis only

1 Rates shown represent estimated use. The current Forest Plan contains no specific standards. All utilization and stubble height standards are analyzed at the AMP level.

For Alternative 1, all acres that are suitable for livestock grazing are equal to the acres that are capable; except for those areas where grazing is presently not authorized or does not occur. Existing areas that are presently not suitable for livestock grazing, include but are not limited to developed campgrounds, Research Natural Areas, Administrative Sites, the Pocatello municipal

watershed, areas closed for watershed protection, exclosures, Highway 89 corridor, and some active mining sites. (For additional information see Chapter 4 Livestock Grazing).

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 1, mining operations, reclamation, and hazardous substance management would assure sediment control, control hazardous substance releases, and maintain acceptable levels of site restoration. Although not required in the existing Forest Plan, standard operating procedures for phosphate mines include topsoil salvage, pit backfill, and reclaimed slopes no greater than 3:1. These practices would continue. Future phosphate leasing would be considered on a case-by-case basis with site-specific NEPA analysis.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat

The 1985 Forest Plan was amended in 1995 by the Inland Native Fish Strategy Environmental Assessment (INFISH). The strategy established new riparian goals, interim Riparian Management Objectives, standards, guidelines, and Riparian Habitat Conservation Areas for all new, proposed, and some ongoing projects and activities within the Snake River Basin. Although the amendment did not apply to National Forest System lands within the Bear River Basin, the Forest chose to informally adopt and apply INFISH standards in the Bear River Basin.

This new direction replaced the existing Forest Plan direction, except where the Plan provides more protection for fish habitat. In this Alternative, riparian and aquatic resource management would focus on attainment of water quality and aquatic habitat features through the application of INFISH direction and Best Management Practices, a system of accepted practices that protect key resources or prevent undesirable impacts while allowing for existing uses. Site-specific riparian livestock utilization rates would be established in this Alternative on a site-specific basis through allotment management planning.

Timber Sale Program

Forested lands would be managed to improve the productivity and vigor of timber stands, generally using even-aged management practices. A relatively high level (60 mmbf) of commodity timber outputs would be expected over the decade.

- *Table 2. 7. Proposed Timber Program Emphasis in Alternative 1.*

Alternative 1	Measurement
Suitable acres	125,300 acres
Types of forested vegetation emphasized in treatments	All forested types considered
Suitable forested acres harvested in the 1st decade	15,700 acres
Unsuitable forested acres harvested in the 1st decade	1,100 acres
Estimated Allowable Sale Quantity per decade	60 mmbf
Fuelwood harvest per decade	25 thousand cords
Miles of road needed for harvest activities per decade	81 miles
Silvicultural methods allowed	All methods
Use of even-age management	High
Regeneration	5,500 acres
Pre-commercial thinning	3,100 acres

Recommended Wilderness and Roadless Area Management

The first Forest Plan Roadless Area evaluation was completed in 1985. As a result of this evaluation, portions of two Roadless Areas were recommended for possible inclusion in the National Wilderness Preservation System. In 1986, the Forest Plan decision was appealed and eventually resolved through a Settlement Agreement. In the settlement agreement, forest managers agreed to exclude scheduled timber harvest in eight other Roadless Areas – Caribou City, Stump Peak, Toponce, Gannett Spring, Bear Creek, Oxford Peak, Elkhorn Mountain, and Bonneville Peak – until the year 2000 or with revision of the 1985 Forest Plan.

Under Alternative 1, those portions (30,600 acres) of the Mt. Naomi and Worm Creek Roadless Areas recommended for Wilderness in 1985 would be retained and managed to protect and maintain Wilderness characteristics. Of these acres, approximately 14,600 acres in Mt. Naomi would be managed as non-motorized, both summer and winter. Approximately 16,000 acres in Worm Creek would be managed for summer motorized recreation on designated routes with cross-country motorized winter travel.

The Roadless Area Conservation Rule (RACR) would not be applied in this Alternative. The purpose of the No Action Alternative is to display the effects and opportunities of continued management under the 1985 Forest Plan. The RACR was not in effect for the fifteen-year period up to 2000; therefore, the RACR was not applied in Alternative 1. This permits a clearer display of the differences between current management and management proposed under the other Alternatives.

In Roadless Areas not recommended for Wilderness, new road construction and timber harvest on suited lands would be allowed. Roadless Areas currently managed for summer non-motorized recreation, such as Caribou City, would remain non-motorized in the summer. Roadless Areas currently managed for summer motorized recreation would remain open to motorized use.

Wildlife Habitat Management

Wildlife habitats would be managed to ensure viable and continuing populations on the Forest. Wildlife habitat management would focus on developing effective habitat by managing vegetation condition. Protection of unique habitats and recovery of Threatened and Endangered Species would occur thru the appropriate recovery process. A minimum of ten percent of the forested acres forest-wide would be managed as old growth or old growth recruitment where sufficient old growth does not currently exist. Stronghold habitat for fish and wildlife addressed in specific recovery plans would be managed to meet legal requirements. Low emphasis would be placed on retaining and improving wildlife corridors.

Alternative 1

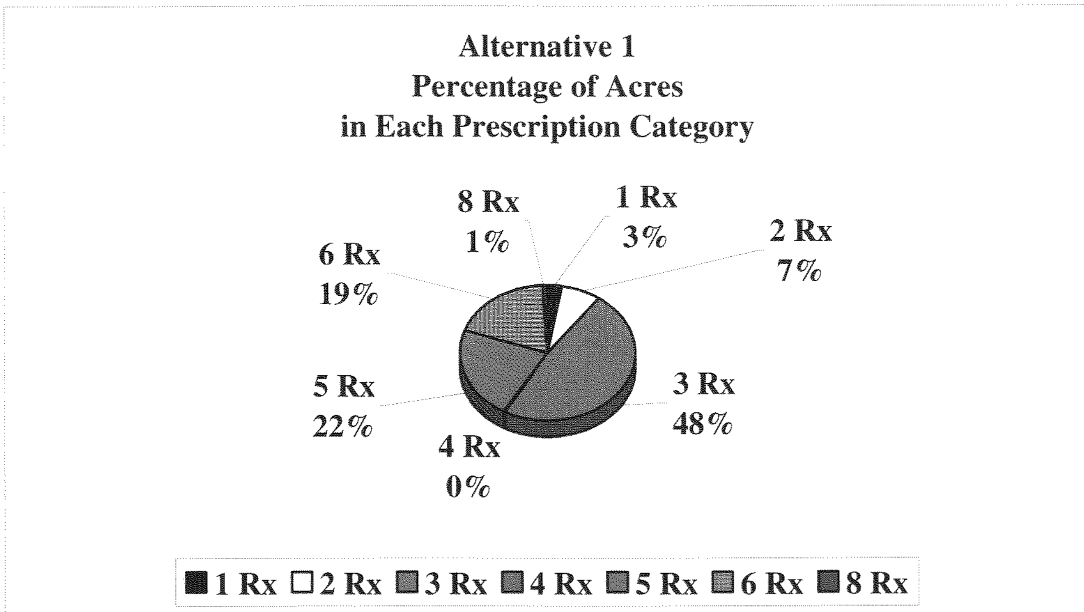
- *Table 2. 10. Prescription Acres in Alternative 1.*

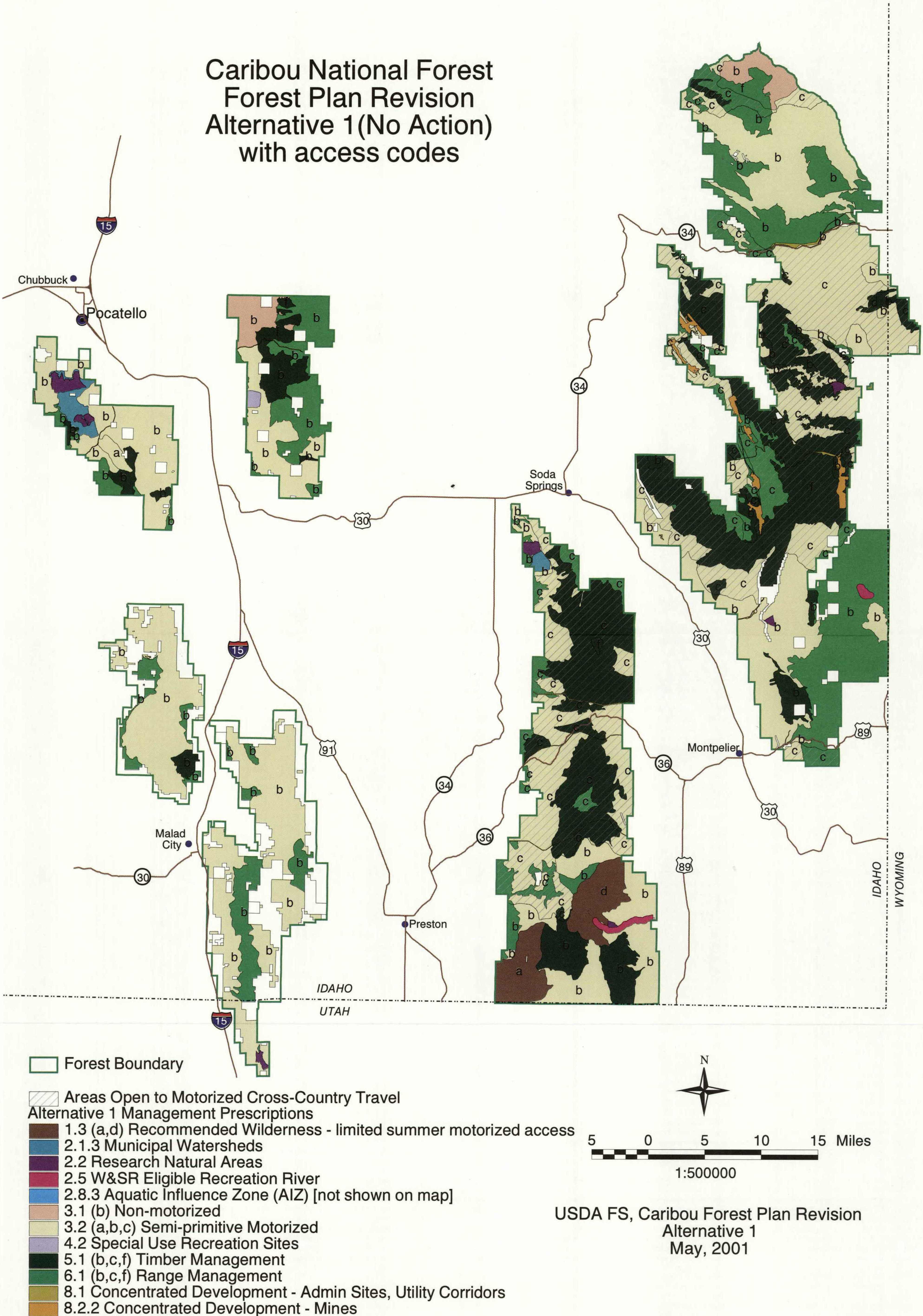
Prescription Category	RX Name	RX No./Access	Acres in Prescription
Wilderness Back Country	Mt. Naomi year-round non-motor	1.3(a)	14,600
	Worm Creek year-round motor	1.3(d)	16,000
Special Management Areas	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Aquatic Influence Zone	2.8.3	60,700
Semi-primitive non-intensive	Summer non-motor; winter m otor	3.1(b)	17,600
	Summer motor trails; winter non-motorized	3.2(a)	2,500
	Year-round motorized	3.2(b)	303,700
	Cross-country; year-round motor	3.2(c)	175,900
Developed Dispersed Recreation	Special Use Permit recreation sites access	4.2	100,078
Timber	Year-round motorized	5.1(b)	50,800
	Cross-country; year-round motor	5.1(c)	123,100
	Summer non-motor; winter motor	5.1(f)	55,300
Rangeland	Year-round motorized	6.1(b)	146,800
	Cross-country; year-round motor	6.1(c)	45,500
	Summer non-motor; winter motor	6.1(f)	4,200
Concentrated Development	Utility corridors, commercial and administrative sites	8.1	100
	Existing leases, undeveloped	8.2.1	3,200
	Active and reclaimed mines	8.2.2	6,100
Total			1,042,200

- *Table 2. 12 Probable Treatments in Alternative 1*

Probable Treatments in the First Decade	Alternative 1
Suitable Forested Acres Harvested	15,700
Unsuitable Forested Acres Harvested	1,100
Forested Acres Treated with Fire	None
Subtotal of Forested Acres Treated	16,800
Non-Forested Acres Treated with Fire	130,000
Total Acres Treated In Decade	146,800

- *Figure 2. 1 Percentage of Acres in each Prescription Category in Alternative 1.*




Caribou National Forest
Forest Plan Revision
Alternative 1(No Action)
with access codes
Chubbuck
Pocatello
Soda Springs
Montpelier
Malad City
Preston
IDAHO
UTAH
WYOMING
15
30
34
36
89
91
Forest Boundary
Areas Open to Motorized Cross-Country Travel
Alternative 1 Management Prescriptions
1.3 (a,d) Recommended Wilderness - limited summer motorized access
2.1.3 Municipal Watersheds
2.2 Research Natural Areas
2.5 W&SR Eligible Recreation River
2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
3.1 (b) Non-motorized
3.2 (a,b,c) Semi-primitive Motorized
4.2 Special Use Recreation Sites
5.1 (b,c,f) Timber Management
6.1 (b,c,f) Range Management
8.1 Concentrated Development - Admin Sites, Utility Corridors
8.2.2 Concentrated Development - Mines
Other Ownership
N
5 0 5 10 15 Miles
1:500000
USDA FS, Caribou Forest Plan Revision
Alternative 1
May, 2001

MAP 2.1

ALTERNATIVE 2 (Proposed Action)

THEME

Alternative 2 proposes to strengthen existing direction in the 1985 Forest Plan to address the "needs for change" identified by the Forest Service and described in the ***Analysis of the Management Situation*** (AMS) dated April, 1999. This Alternative reflects the likely outcomes of managing forest resources to attain a range of "desired future condition" statements outlined in the AMS.

Access and Recreation Management

Summer motorized recreation would be managed using open motorized road and trail densities at or near current levels on designated routes. As opportunities arise, trails would be redesigned or relocated out of riparian areas. No new motorized roads or trails would be permitted unless an equal length of motorized road or trail is closed, generally within the same prescription area. Approximately 420,200 acres (about forty percent) open to motorized cross-country use would be retained in this Alternative.

The Forest would remain open to motorized winter travel, except in that portion (~14,600 acres) of the Mt. Naomi Roadless Area recommended for Wilderness in the 1985 Forest Plan. Some areas would be seasonally closed for big game winter range or for non-motorized winter recreation, as currently managed.

Developed and dispersed recreation opportunities would be maintained at current levels or increased as resources and budgets allow.

Economics

Economic outcomes would be the result of managing resources to attain a clearly defined range of desired future conditions. Economic benefits would be determined by the rate of change (fast or slow) of achieving those conditions.

Ecosystem Management

Disturbance

Disturbances would be allowed to operate naturally in order to maintain or restore ecological processes and function. Insect and disease disturbances would be allowed to play their natural roles where appropriate and desirable, although epidemics generally would be treated for control. Prescribed fire, mechanical treatments, and wildland fire use would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would be allowed to burn in other areas to benefit resource values.

Forested Vegetation

Conifer sites, particularly mixed conifer, aspen/conifer, and aspen, would be managed to attain or maintain thirty to forty percent of these acres in a mature/old age structure. Approximately 34,100 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Aspen would be treated to restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 100 years.

- *Table 2. 13. Alternative 2. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	30-40%	550,000	34,100	17,400	16,700

1 A component of these acres is likely to be non-lethal fire.

Non-forested Vegetation

Sagebrush and mountain shrub sites would be managed to retain thirty to fifty percent of the acres per decade in greater than fifteen percent canopy cover. Approximately 77,500 acres would be treated during the decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected within 75 years, and within 100 years on tall forb sites where capability exists.

- *Table 2. 15. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	30-50%	40%	75 years	77,500

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

Livestock Grazing

Rangelands would be managed to provide forage for livestock and wildlife while protecting productivity and coordinating with other uses. Non-forested vegetation would be managed to provide forage production for livestock and wildlife, which include the installation of fences and water developments for livestock management systems and practices. Livestock grazing would be managed through forest-wide livestock forage utilization levels, shown in the table below. (For additional information see Chapter 4 Livestock Grazing)

- *Table 2. 17. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates
Upland Browse	35%-45%
Upland Herbaceous	45%
Riparian Properly Functioning Condition – on greenline **Herbaceous** **Browse** **Stubble Height**	45% Site-specific 4 inches
Riparian (At risk) – on greenline **Herbaceous** **Browse** **Stubble Height**	45% Site-specific 6 inches
Riparian (Non-Functioning) – on greenline **Herbaceous** **Browse** **Stubble Height**	45% Site-specific 6 inches
Percent Bank Disturbance	Does not apply
Percent Soil Disturbance	Does not apply
Winter Range Browse	10%
Winter Range Herbaceous	30%

Livestock suitability is the same as Alternative 1.

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 2, an adaptive approach to mining operations, reclamation, and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous

substance management would be adaptively applied using Best Management Practices. Research and monitoring activities would continue to be used to improve Best Management Practices. Hazardous substance releases would be managed to prevent releases in excess of established state and federal standards. Future phosphate leasing would be considered on a case-by-case basis with site-specific NEPA analysis.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian and aquatic resource management would focus on maintaining or restoring properly functioning condition to streams and wetlands by implementing riparian livestock forage utilization levels and establishing zones of special emphasis for riparian areas and aquatic habitat (See Table 2.8 under Livestock Grazing for riparian utilization).

Timber Sale Program

In this Alternative, an ecological approach to vegetation management would be used to meet ecological objectives. Vegetation management activities would be designed to reduce risks to property, merchantable products, and economic and social opportunities that can result from large, epidemic disturbance events. The production of timber and wood fiber would be considered a by-product of vegetation treatments that are designed to restore landscapes closer to their historical range of variability.

- *Table 2. 19. Proposed Timber Program Emphasis in Alternative 2.*

Alternative 2	Measurement
Suitable acres	114,900 acres
Types of vegetation emphasized in treatments	Mixed conifer, aspen/conifer, aspen
Suitable forested acres harvested in the 1st decade	14,300 acres
Unsuitable forested acres harvested in the 1st decade	2,400 acres
Estimated Allowable Sale Quantity per decade	56 mmbf
Fuelwood harvest per decade	22 thousand cords
Miles of road needed for harvest activities per decade	73 miles
Silvicultural methods allowed	All methods
Use of even-age management	Moderate
Regeneration	5,000 acres
Pre-commercial thinning	2,800 acres

Recommended Wilderness and Roadless Area Management

Under Alternative 2 those portions of the Mt. Naomi and Worm Creek Roadless Areas (30,600 acres) recommended for Wilderness in 1985 would be retained and managed to protect and maintain Wilderness characteristics. Of these acres, approximately 14,600 acres in Mt. Naomi would be managed as non-motorized, both summer and winter. Approximately 16,000 acres in Worm Creek would be managed for summer, motorized recreation on designated routes with cross-country motorized winter travel allowed.

The Roadless Area Conservation Rule (RACR) would not apply in this Alternative. The Proposed Action was released for public scoping in August 1999. The significant issues were developed from public comments on the Alternative; therefore, this Alternative will be analyzed

as described in the original proposal without the RACR. In Roadless Areas not recommended for Wilderness, new road construction and timber harvest would be allowed.

Roadless areas in this Alternative not recommended for Wilderness and currently managed for summer non-motorized recreation, such as Caribou City, would remain non-motorized in summer. Roadless areas currently managed for summer motorized recreation would remain open to motorized use.

Wildlife Habitat Management

Wildlife habitats would be managed to ensure viable and continuing populations on the Forest. Wildlife habitat management would focus on developing effective habitat by managing vegetation condition. Protection of unique habitats and recovery of Threatened and Endangered Species would occur thru the appropriate recovery process. A minimum of twenty percent of the forested acres of each fifth code HUC would be maintained in a late seral/old growth condition (of which fifteen percent would be managed as old growth or old growth recruitment where sufficient old growth does not currently exist).

Big game winter range would be emphasized in selected areas where it is identified. Stronghold habitat for fish and wildlife addressed in specific recovery plans would be managed with a moderate emphasis. Moderate emphasis would be placed on retaining and improving wildlife corridors.

Alternative 2

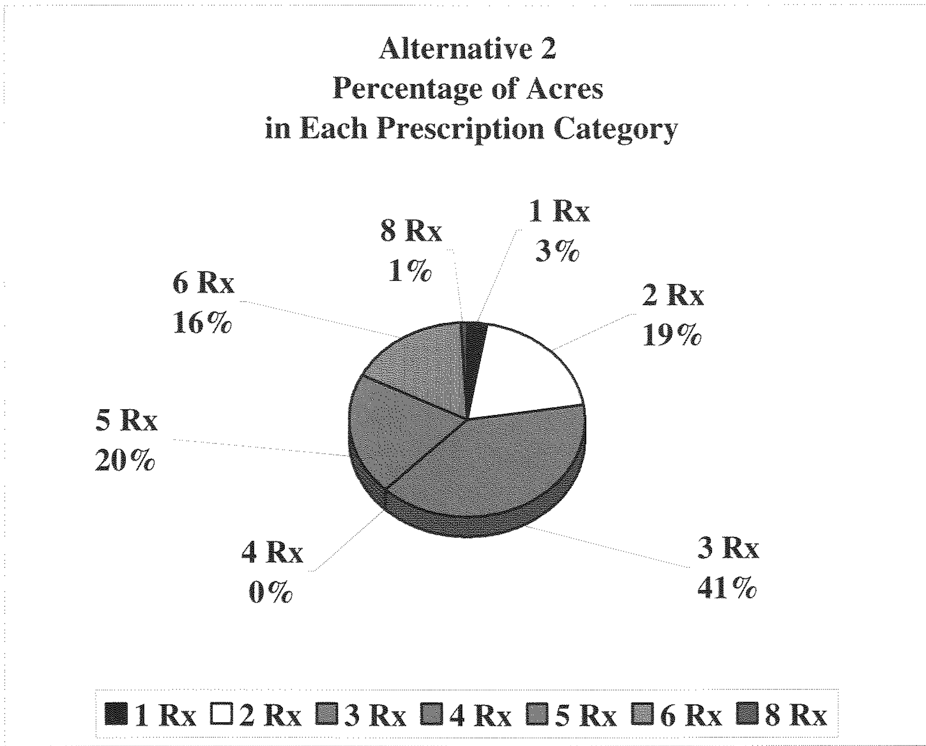
- *Table 2. 21. Prescription Acres in Alternative 2.*

Prescription Category	Prescription Name	RX No. /Access	Acres in Prescription
Wilderness /Back Country	Mt. Naomi year-round non-motorized	1.3(a)	14,600
	Worm Creek year-round motor	1.3(d)	16,000
Special Management Area	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (Forage) summer motor; winter non-motor	2.7.1(a)	8,900
	Winter range (Forage) summer motor; winter motor designated routes	2.7.1(b)	65,900
	Winter range (Forage) summer motor x-c; winter motor designated routes	2.7.1(c)	49,500
	Winter range (Forage emphasis) non-motor	2.7.1(d)	3,400
	Aquatic Influence Zone	2.8.3	60,700
Semi-primitive Non-intensive	Summer non-motor; winter motor	3.1(b)	17,600
	Summer motor on trails; winter non-motor	3.2(a)	2,500
	Year-round motor	3.2(b)	250,400
	Cross-country; year-round motor	3.2(c)	143,200
Dispersed/ Developed Recreation	Special Use Permit recreation sites access	4.2	1,100
Timber	Year-round motor	5.1(b)	46,300
	Cross-country; year-round motor	5.1(c)	161,500
	Summer non-motor; winter motor	5.1(f)	4,600
Rangeland	Year-round motor	6.1(b)	125,900
	Cross-country; year-round motor	6.1(c)	41,500
	Summer non-motor; winter motor	6.1(f)	4,200
Concentrated Development Area	Utility corridors, commercial and administrative sites	8.1	100
	Existing leases, undeveloped	8.2.1	3,200
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

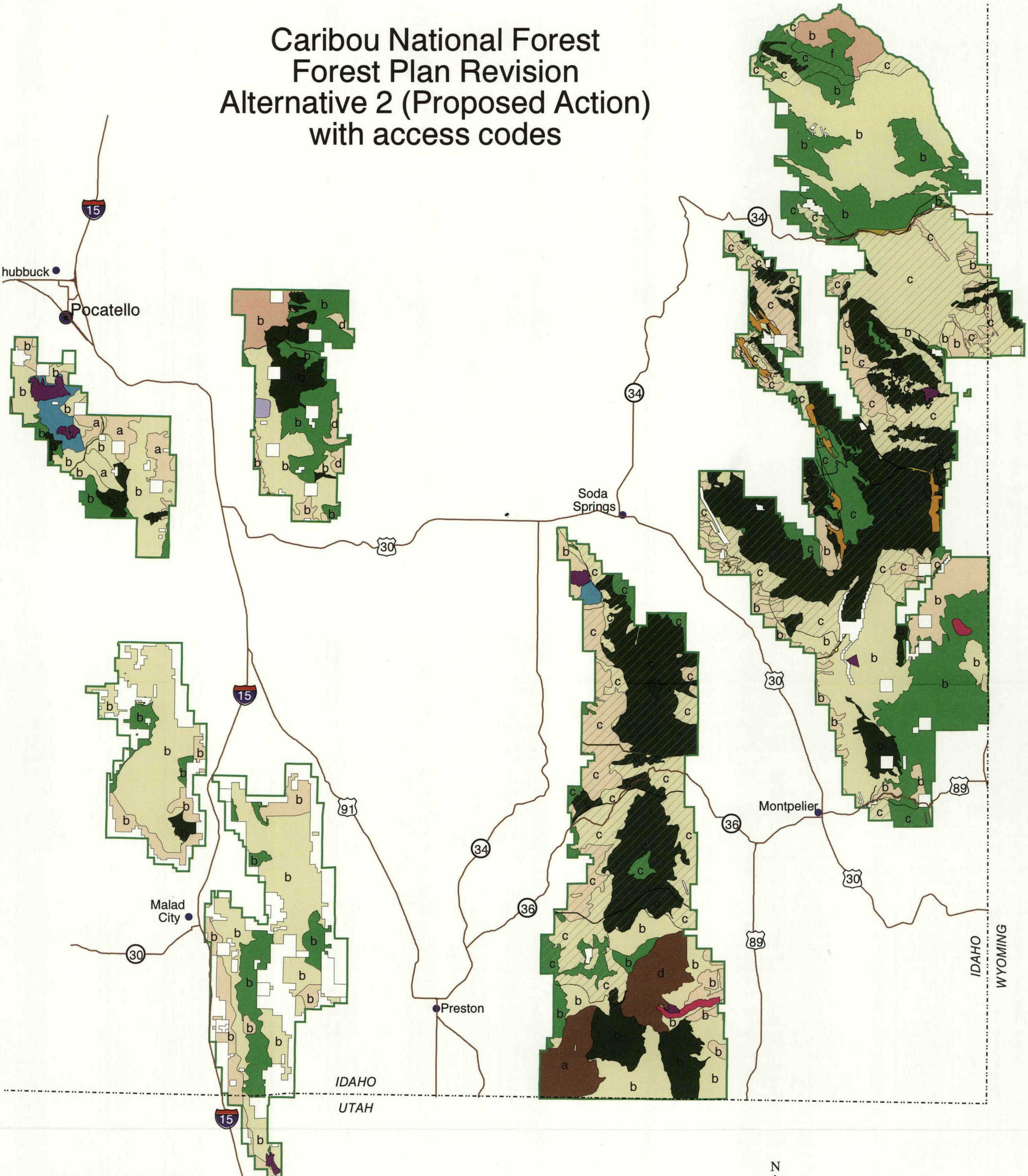
- *Table 2. 23 Probable Treatments in Alternative 2*

Probable Treatments in the First Decade	Alternative 2
Suitable Forested Acres Harvested	14,300
Unsuitable Forested Acres Harvested	2,400
Forested Acres Treated with Fire	17,400
Subtotal of Forested Acres Treated	34,100
Non-Forested Acres Treated with Fire	77,500
Total Acres Treated In Decade	111,600

- *Figure 2. 2 Percentage of Acres in each Prescription Category in Alternative21.*



Caribou National Forest
Forest Plan Revision
Alternative 2 (Proposed Action)
with access codes



Forest Boundary

Areas Open to Motorized Cross-Country Travel

Alternative 2 Management Prescriptions

- 1.3 (a,d) Recommended Wilderness - limited summer motorized access
- 2.1.3 Municipal Watersheds
- 2.2 Research Natural Areas
- 2.5 W&SR Eligible Recreation River
- 2.7.1 (a,b,c,d) Elk & Deer Winter Range - Critical
- 2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
- 3.1 (b) Non-motorized
- 3.2 (a,b,c) Semi-primitive Motorized
- 4.2 Special Use Recreation Sites
- 5.1 (b,c,f) Timber Management
- 6.1 (b,c,f) Range Management
- 8.1 Concentrated Development - Admin Sites, Utility Corridors
- 8.2.1 Existing Mine Leases [not shown on map]
- 8.2.2 Concentrated Development - Mines
- Other Ownership

N

5 0 5 10 15 Miles

1:500000

USDA FS, Caribou Forest Plan Revision
Alternative 2
May, 2001

MAP 2.2

ALTERNATIVE 3

THEME

Alternative 3 proposes to manage forest resources to produce more goods and services to meet the needs of people. This Alternative reflects the likely outcomes of managing the Forest for a relatively high level of a variety of uses and water yield while maintaining site productivity and environmental quality to meet state and federal regulations. It emphasizes the issues of economics, based on commodity production, livestock grazing, motorized access, the timber sale program, and mining.

Access and Recreation Management

Summer motorized recreation would be managed by increasing open motorized road and trail densities in some areas of the Forest. Public access would be improved, particularly in high use areas. About 419,550 acres (about forty percent) open to summer motorized cross-country use would be retained in this Alternative.

The Forest would remain open to motorized winter travel, except on small areas across the Forest where seasonal closures would be used in big game winter range areas and to provide non-motorized recreation opportunities.

Developed and dispersed recreation opportunities would increase as demand increases.

Economics

Economic outcomes would be the result of active management of forest resources to produce an array of goods and services on a non-declining yield basis.

Ecosystem Management

Disturbances

Disturbances would be permitted to operate naturally where commodity values are not unduly jeopardized. Insect and disease disturbances generally would be suppressed to reduce the risk of these occurrences and stand-replacing wildfires. Prescribed fire, mechanical treatments, and wildland fire would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients in appropriate areas, primarily in rangelands, with limited use in forest vegetation. In addition, priority would be placed on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would not be allowed to burn in other areas to benefit resource values.

Forested Vegetation

Conifer sites, particularly Douglas-fir, lodgepole pine, and mixed conifer, would be managed to maintain twenty percent of these acres in a mature/old age structure. Approximately 41,800 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Aspen would be treated to moderately restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 75 years.

- *Table 2. 24. Alternative 3. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	20%	550,000	41,800	19,900	21,900

1 A component of these acres is likely to be non-lethal.

Non-forested Vegetation

Non-forested vegetation would be managed to provide relatively high forage production for livestock grazing. Approximately 100,000 acres would be treated over the decade. Management activities would include prescribed fire treatments and seedings of forage-producing plants, installation of fences, and water developments for livestock management systems and practices.

Sagebrush and mountain shrub would be managed to allow thirty to fifty percent of the acres to remain in greater than fifteen percent canopy cover. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome.

Retention and restoration of tall forb sites, where they exist, would be addressed at the site-specific level, based on research findings.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected to be reached within 50 to 75 years.

- *Table 2. 26. Alternative 3. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	30-50%	40%	50-75 years	100,000

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Rangelands would be managed to provide forage for livestock and wildlife while protecting productivity and coordinating with other uses. Non-forested vegetation would be managed to provide forage production for livestock and wildlife, and include the installation of fences and water developments for livestock management systems and practices. Forage created as a result of prescribed burning could be allocated to livestock production goals. Livestock grazing would be managed through forest-wide livestock forage utilization levels, shown in the table below (For additional information see Chapter 4 Livestock Grazing):

Livestock grazing would be managed through forest-wide livestock forage utilization levels shown below:

- *Table 2. 28. Alternative 3. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
All Riparian Areas – on greenline **Herbaceous** **Browse** **Stubble Height**	 Does not apply 30% 3-4 inches[1]
Percent Bank Disturbance	Does not apply
Percent Soil Disturbance	30%[2]
Winter Range Browse	25%
Winter Range Herbaceous	35%

1 Three-inch stubble height in the Aquatic Influence Zone and four-inch stubble height on the greenline.
2 At the watershed and subwatershed scale.

Livestock suitability is the same as Alternatives 1 and 2.

MINING OPERATIONS, RECLAMATION AND HAZARDOUS SUBSTANCE MANAGEMENT

Under Alternative 3, an adaptive approach to mining operations, reclamation and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous substance management would be adaptively applied using Best Management Practices. Research

and monitoring activities would continue to be used to improve Best Management Practices. Hazardous substance releases would be managed to prevent releases in excess of established state and federal standards. Future phosphate leasing would be considered on a case-by-case basis with site-specific NEPA analysis.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian and aquatic resource management would focus on maintaining or restoring properly functioning condition to streams and wetlands by implementing riparian livestock forage utilization levels and establishing zones of special emphasis for riparian areas and aquatic habitat. (See Table 2.13 under Livestock Grazing for riparian utilization).

Timber Sale Program

Under Alternative 3, forested vegetation resources would be managed to produce a sustained yield of wood products, particularly high quality saw timber and consequently higher water yield, on forested lands suitable for intensive management.

- *Table 2. 30. Proposed Timber Program Emphasis Alternative 3.*

Alternative 3	Measurement
Suitable acres	150,400 acres
Types of vegetation emphasized in treatments	Douglas-fir, lodgepole pine, mixed conifer
Suitable forested acres harvested in the 1st decade	19,000 acres
Unsuitable forested acres harvested in the 1st decade	2,900 acres
Estimated Allowable Sale Quantity per decade	67 mmbf
Fuelwood harvest per decade	30 thousand cords
Miles of road needed for harvest activities per decade	98 miles
Silvicultural methods allowed	All methods
Use of even-age management	High
Regeneration	6,500 acres
Pre-commercial thinning	3,700 acres

Recommended Wilderness and Roadless Area Management

The portions of the Mt. Naomi and Worm Creek Roadless areas, recommended for Wilderness in the 1985 Land and Resource Management Plan, would not be recommended in this Alternative, and no other areas would be recommended.

Summer motorized travel on designated routes would be permitted in the portions of the Mt. Naomi and Worm Creek Roadless Areas not recommended for Wilderness in this Alternative. Motorized winter travel would be allowed in both of these areas under this Alternative.

The Roadless Area Conservation Rule (RACR) would not apply in this Alternative. Alternative 3 was originally developed before issuance of the RACR and was publicly reviewed at the November 2000 public open houses. This Alternative received substantial local support in comments provided by the participating public; therefore, it was decided to retain Alternative 3 for detailed analysis to display more effectively the environmental and multiple use trade-offs

compared to Alternatives that incorporate the RACR. Timber harvest on suited lands and road building would be allowed inside inventoried roadless areas.

Roadless areas managed for summer non-motorized recreation would decrease over current levels. Roadless areas managed for summer motorized recreation would increase over current levels.

WILDLIFE HABITAT MANAGEMENT

Wildlife habitat management would focus on developing effective habitat by managing vegetation condition. Protection of unique habitats and recovery of Threatened and Endangered Species would occur thru the appropriate recovery process. A minimum of twenty percent of the forested acres forest-wide would be maintained in late seral/old growth conditions in each 5th code HUC[2]. Ten percent of the forested acres in the HUC would be managed as old growth or for old growth recruitment where sufficient old growth currently does not exist.

Big game winter range would be emphasized in selected areas. Stronghold habitat for fish and wildlife addressed in specific recovery plans would be managed to meet legal requirements and improve conditions. Low emphasis would be placed on retaining and improving wildlife corridors.

[2] A level of Hydrologic Unit Code (HUC) mapping hierarchy developed by the U.S. Geologic Service and used for the Interior Columbia Basin Ecosystem Management Project (ICEBMP) to map geographic boundaries of watersheds at various scales.

Alternative 3

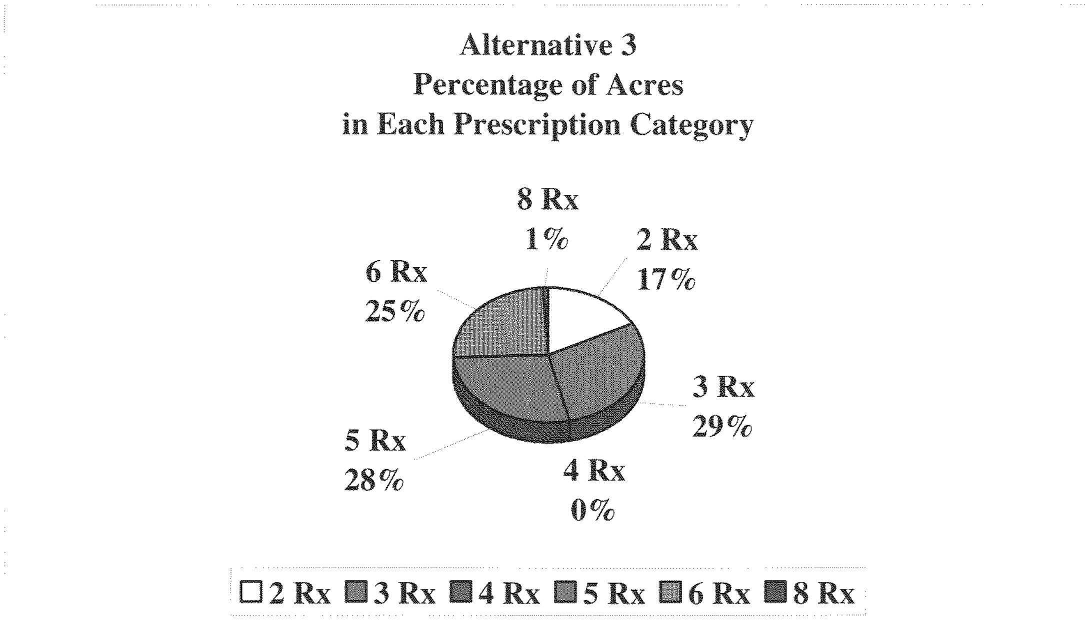
• *Table 2. 32. Prescription Acres in Alternative 3.*

Prescription Category	Prescription Name	RX No. /Access	Acres in Prescription
Special Management Area	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range, winter non-motor	2.7.2(a)	8,700
	Winter range, summer motor; winter designated routes	2.7.2(b)	57,400
	Winter range, summer cross-country; Winter motor designated routes	2.7.2(c)	33,500
	Winter range, year-round non-motor	2.7.2(d)	3,400
	Aquatic Influence Zone	2.8.3	62,000
Semi-primitive non-intensive	Summer motor trails; winter non-motor	3.2(a)	2,500
	Year-round motor	3.2(b)	204,100
	Cross-country; year-round motor	3.2(c)	95,900
Developed Dispersed Recreation	Special Use Permit recreation sites access	4.2	1,100
Timber	Year-round motor	5.1(b)	100,300
	Cross-country; year-round motor	5.1(c)	188,300
	Summer non-motor; winter motor	5.1(f)	4,600
Rangeland	Year-round motor	6.1(b)	165,500
	Cross-country; year-round motor	6.1(c)	78,500
	Summer non-motor; winter motor	6.1(f)	12,000
Concentrated Development Area	Utility corridors, commercial and administration sites	8.1	100
	Existing leases, undeveloped	8.2.1	3,200
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

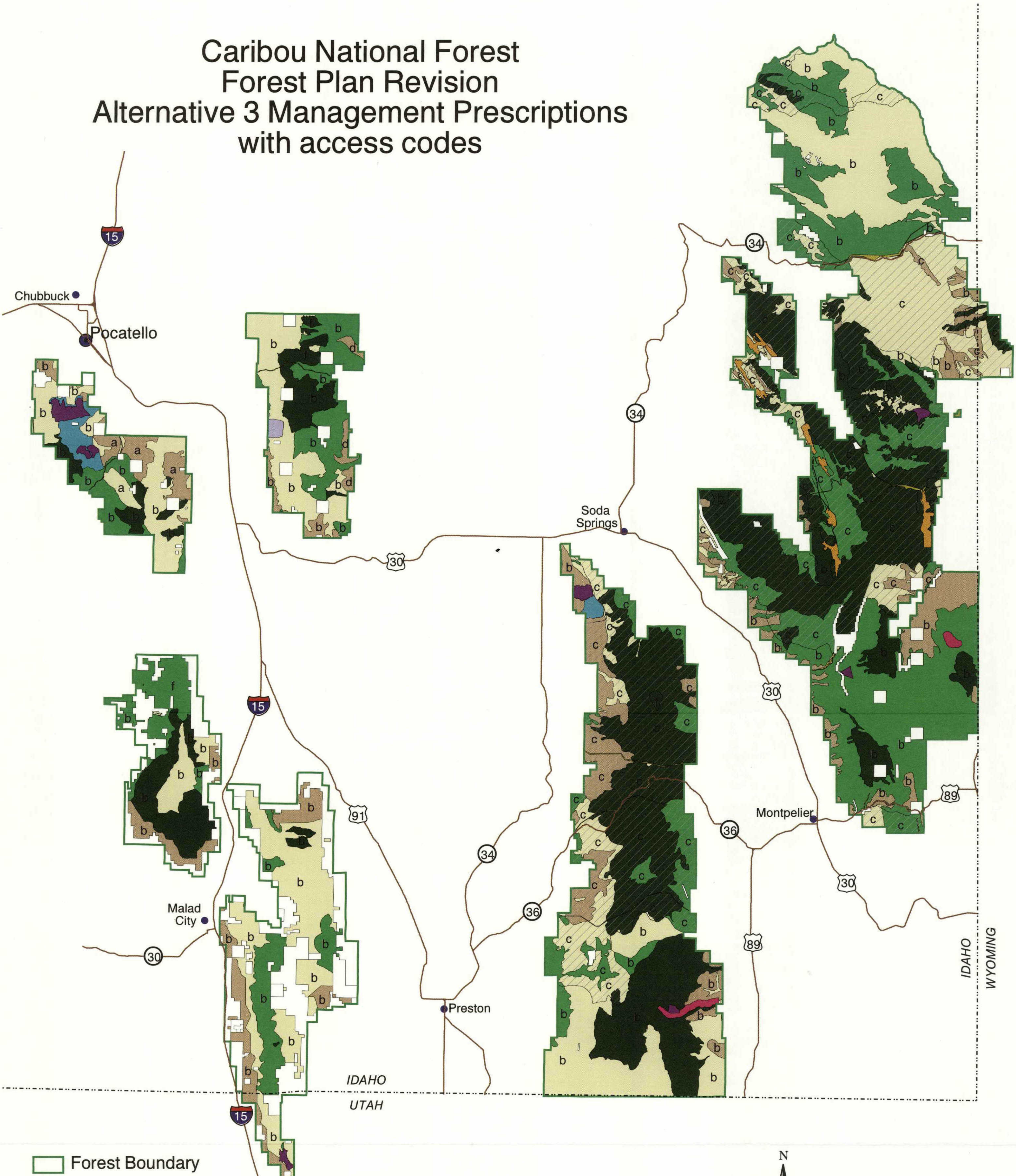
- *Table 2. 34 Probable Treatments in Alternative 3.*

Probable Treatments in the First Decade	Alternative 3
Suitable Forested Acres Harvested	19,000
Unsuitable Forested Acres Harvested	2,900
Forested Acres Treated with Fire	19,900
Subtotal of Forested Acres Treated	41,800
Non-Forested Acres Treated with Fire	100,000
Total Acres Treated In Decade	141,800

- *Figure 2. 3 Percentage of Acres in each Prescription Category in Alternative 3.*



Caribou National Forest
Forest Plan Revision
Alternative 3 Management Prescriptions
with access codes



Forest Boundary

Areas Open to Motorized Cross-Country Travel

Alternative 3 Management Prescriptions

- 2.1.3 Municipal Watersheds
- 2.2 Research Natural Areas
- 2.5 W&SR Eligible Recreation River
- 2.7.2 (a,b,c,d) Elk & Deer Winter Range
- 2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
- 3.1 Non-motorized
- 3.2 (a,b,c) Semi-primitive Motorized
- 4.2 Special Use Recreation Sites
- 5.1 (b,c,f) Timber Management
- 6.1 (b,c,f) Range Management
- 8.1 Concentrated Development - Admin Sites, Utility Corridors
- 8.2.1 Existing Mine Leases [not shown on map]
- 8.2.2 Concentrated Development - Mines
- Other Ownership

N

5 0 5 10 15 Miles

1:500000

USDA FS, Caribou Forest Plan Revision
Alternative 3
May, 2001

MAP 2.3

ALTERNATIVE 4

THEME

Alternative 4 proposes to manage forest vegetation using a mix of restoration strategies, including timber harvest, thinning, and fire, to achieve ecological objectives. It focuses on an accelerated program of vegetation management to restore or maintain ecosystem processes that function properly in the long term. Restoration efforts would be emphasized on landscapes where vegetation is at higher risk to catastrophic disturbance, or where watershed condition or function is impaired. Although this Alternative is similar to Alternative 2, it proposes a more aggressive approach to vegetation management, road rehabilitation and obliteration, and prescribed burning. It emphasizes issues of ecosystem management, minerals management, riparian/wetland areas, aquatic habitat, water quality, non-motorized access, and wildlife.

Access and Recreation Management

Some summer motorized recreation areas would be managed using lower open motorized road and trail densities from current levels. Areas currently open to summer motorized cross-country travel would be changed to open on designated routes only.

The Forest would remain open to motorized winter travel, except in that portion (~14,600 acres) of the Mt. Naomi Roadless Area recommended for Wilderness in the 1985 Forest Plan. Motorized winter travel would be restricted to designated routes in wildlife emphasis areas and prohibited in areas recommended for Wilderness in the Caribou City and Stump Peak Roadless Areas.

Developed and dispersed recreation opportunities would be maintained at current levels. Mitigation measures would be used on sites currently located in riparian areas.

Economics

Economic outcomes would be the result of managing for resources with an array of restoration strategies. Various forest goods, services, and products would be a byproduct of these strategies.

Ecosystem Management

Disturbances

Disturbances would be allowed to operate naturally in order to maintain or restore ecological processes and function. Insect and disease disturbances would be allowed to play their natural roles where appropriate and desirable, although epidemic disturbances generally would be treated for control. Prescribed fire, mechanical treatment, and wildland fire would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would be allowed to burn in other areas to benefit resource values.

Forested Vegetation

Conifer sites, particularly mixed conifer, aspen/conifer and aspen, would be managed to maintain thirty to forty percent of these acres in a mature/old age structure. Approximately 57,000 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Aspen would be aggressively treated to restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 100 years.

- *Table 2. 35. Alternative 4. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	30-40%	550,000	57,000	49,900	7,100

1 A component of these acres is likely to be non-lethal fire.

Non-Forested Vegetation

Sagebrush and mountain shrub would be managed to allow thirty to fifty percent of the acres to remain in greater than fifteen percent canopy cover. Approximately 77,500 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected within 50-75 years and within 100 years on tall forb sites.

- *Table 2. 37. Alternative 4. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	30-50%	40%	50-75 years	75,500

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Livestock grazing would be managed to restore and protect aquatic systems, soils, plants, and animals through forest-wide livestock forage utilization levels as shown below. (For additional information, see Chapter 4 Livestock Grazing)

- *Table 2. 39. Alternative 4. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates[1]
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
Riparian Properly Functioning Condition – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-55% based on site-specific analysis 50% based on site-specific analysis 2-6 inches based on site-specific analysis
Riparian (At risk) – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-45% based on site-specific analysis 50% based on site-specific analysis 3-8 inches based on site-specific analysis
Riparian (Non-Functioning) – on greenline and/or the entire AIZ[2] **Herbaceous** **Browse** **Stubble Height**	20-40% based on site-specific analysis 40%-50% based on site-specific analysis 4-8 inches based on site-specific analysis
Percent Bank Disturbance (annual)	10%-25% based on site-specific analysis
Percent Soil Disturbance	5%-15 % based on site-specific analysis
Winter Range Browse	10%-25%
Winter Range Herbaceous	35%-45%

1 The use of any specific parameter, such as percent utilization, stubble height, or bank disturbance, depends on a site-specific analysis. Until such analysis is completed, except for both winter range utilization criteria. The procedure for this analysis is outlined in the Caribou Grazing Implementation Guide, the livestock utilization rate, soil disturbance, and bank disturbance criteria described in Alternative 2 will be used.

2 Aquatic Influence Zone (AIZ).

Livestock suitability is the same as Alternatives 1 through 3, plus additional areas are considered not suitable for livestock grazing. (For additional information, see Chapter 4 Livestock Grazing).

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 4, an adaptive approach to mining operations, reclamation, and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous substance management would be adaptively applied using research and monitoring activities to develop and implement Best Management Practices. Releases of hazardous substances would be managed to prevent releases in excess of established state and federal standards. Because of the Roadless Conservation Initiative, unleased phosphate deposits in inventoried roadless areas would not be recommended for leasing.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian areas and watersheds would be aggressively managed through detailed guidance to maintain water quality and aquatic ecosystems and to restore degraded conditions where they exist. The primary focus of management activities would be on achieving riparian properly functioning condition, watershed protection, and restoration.

Streams in properly functioning condition would be managed to maintain or improve that condition. Streams that are functioning, but "at risk" of further degradation, would have more stringent standards and guidelines applied. Streams considered not functioning would have the most prohibitive standards and guidelines applied. Additional standards and guidelines would be applied on streams identified by the State of Idaho as water quality limited or containing Threatened or Endangered Species. (See Livestock Grazing Table 2.18 for riparian utilization.)

Timber Sale Program

In this Alternative, an ecological approach to vegetation management would be used to meet ecological objectives, particularly on mixed conifer, aspen/conifer, and aspen sites. The production of timber and wood fiber would be a by-product of vegetation treatments designed to move closer to the historical range of variation.

- *Table 2. 41. Proposed Timber Program Emphasis in Alternative 4.*

Alternative 4	Measurement
Suitable acres	52,900 acres
Types of vegetation emphasized in treatments	Mixed conifer, aspen/conifer, aspen
Suitable forested acres harvested per decade	6,600 acres
Unsuitable forested acres harvested per decade	500 acres
Estimated Allowable Sale Quantity per decade	19 mmbf
Fuelwood harvest per decade	10 thousand cords
Miles of road needed for harvest activities per decade	17 miles
Silvicultural methods allowed	All methods
Use of even-age management	Low
Regeneration	2,300 acres
Pre-commercial thinning	1,300 acres

Recommended Wilderness and Roadless Area Management

In this Alternative, all of the Mt. Naomi Roadless Area and portions of Caribou City and Stump Peak would be recommended for Wilderness, a total of 71,300 acres. The 1985 recommended portion of the Worm Creek Roadless Area (~16,000 acres) would not be recommended and would be dropped.

The Mt. Naomi and Caribou City portions recommended for Wilderness would be managed as non-motorized in the summer. The Stump Peak portion recommended for Wilderness would allow summer motorized use on designated routes. The Mt. Naomi portion recommended for Wilderness would be managed for non-motorized winter travel. Caribou City and Stump Peak portions recommended for Wilderness would be open to motorized winter travel.

The Roadless Area Conservation Rule (RACR) would be applied in this Alternative. Road construction and reconstruction would not be allowed. Timber harvest inside inventoried roadless areas would only occur if RACR criteria for such management activity could be met.

Roadless areas managed for summer non-motorized recreation would increase over current levels.

Wildlife Habitat Management

Wildlife habitat management would restore habitat quality for species-at-risk, including Threatened, Endangered, Proposed, Sensitive Species, and other identified species-at-risk. Habitat for hunted species, such as big game and upland birds, would be managed to maintain or restore habitat quality. Management actions could include vegetation treatments in habitats-at-risk, establishment of upland and riparian livestock forage utilization levels, and establishment of road/motorized trail densities. Big game winter range would be emphasized through livestock forage utilization and access management, where it is identified.

A minimum of twenty percent of the forested acres in each 5th code HUC[3] would be maintained in late seral/old growth conditions. Fifteen percent of the forested acres in each HUC would be managed as old growth or for old growth recruitment where sufficient old growth currently does not exist. These acres would be maintained in larger blocks where feasible. Sagebrush stands would be managed in blocks of greater than 250 acres, where possible.

A high emphasis would be placed on maintaining or improving stronghold habitats for wildlife and fish addressed in specific recovery plans. Moderate emphasis would be placed on retaining and improving wildlife corridors.

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[3] A level of Hydrologic Unit Code (HUC) mapping hierarchy developed by the U.S. Geologic Service and used for the Interior Columbia Basin Ecosystem Management Project (ICEBMP) to map geographic boundaries of watersheds at various scales.

Alternative 4

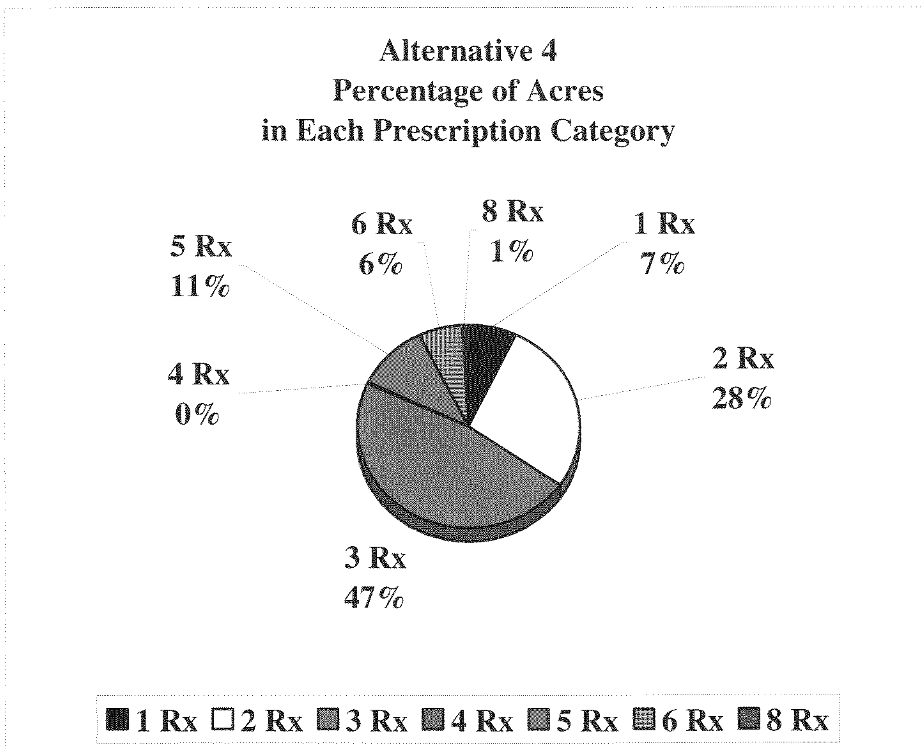
- *Table 2. 43. Prescription Acres in Alternative 4.*

Prescription Category	Prescription Name	RX No. /Access	Acres in Prescription
Wilderness Back Country	Mt. Naomi year-round non-motor	1.3(a)	14,200
	Caribou City summer non-motor; winter motor	1.3(b)	33,100
	Stump Peak; year-round motor	1.3(d)	24,000
Special Management Area	Visual Quality Maintenance	2.1.2	4,200
	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (forage); summer motor; winter non-motor	2.7.1(a)	12,300
	Winter range (forage), year-round motor on designated routes	2.7.1(b)	49,000
	Winter range (forage), summer motor, winter non-motor on designated routes	2.7.1(e)	27,300
	Winter range, summer motor; winter non	2.7.2(a)	3,800
	Winter range, year-round motor on designated routes	2.7.2(b)	122,800
	Aquatic Influence Zone	2.8.3	56,000
Semi-primitive non-intensive	Summer non-motor; winter motor	3.1(b)	28,500
	Year-round motor	3.2(b)	2,400
	Lower OMRD for deer/elk	3.2(d)	30,900
	Summer motor trails; winter non-motor	3.3(a)	1,600
	Year-round motor	3.3(b)	291,700
	Lower OMRD for deer/elk	3.3(d)	130,200
	Summer non-motor; winter motor	3.3(f)	7,900
Developed Dispersed Rec	Special Use Permit recreation sites access	4.2	1,100
Timber	Year-round motor	5.1(b)	31,600
	Lower OMRD for deer/elk	5.1(d)	5,500
Timber restoration	Year-round motor	5.3(b)	59,800
	Lower OMRD for deer/elk	5.3(d)	15,300
Rangeland restoration	Year-round motor	6.3(b)	59,300
	Lower OMRD for deer/elk	6.3(d)	5,600
Concentrated Development Area	Utility corridors, commercial and administrative sites	8.1	100
	Existing leases, undeveloped	8.2.1	2,900
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

- *Table 2. 45 Probable Treatments in Alternative 4.*

Probable Treatments in the First Decade	Alternative 4
Suitable Forested Acres Harvested	6,600
Unsuitable Forested Acres Harvested	500
Forested Acres Treated with Fire	49,900
Subtotal of Forested Acres Treated	57,000
Non-Forested Acres Treated with Fire	77,500
Total Acres Treated In Decade	133,600

- *Figure 2. 4 Percentage of Acres in each Prescription Category in Alternative 4.*



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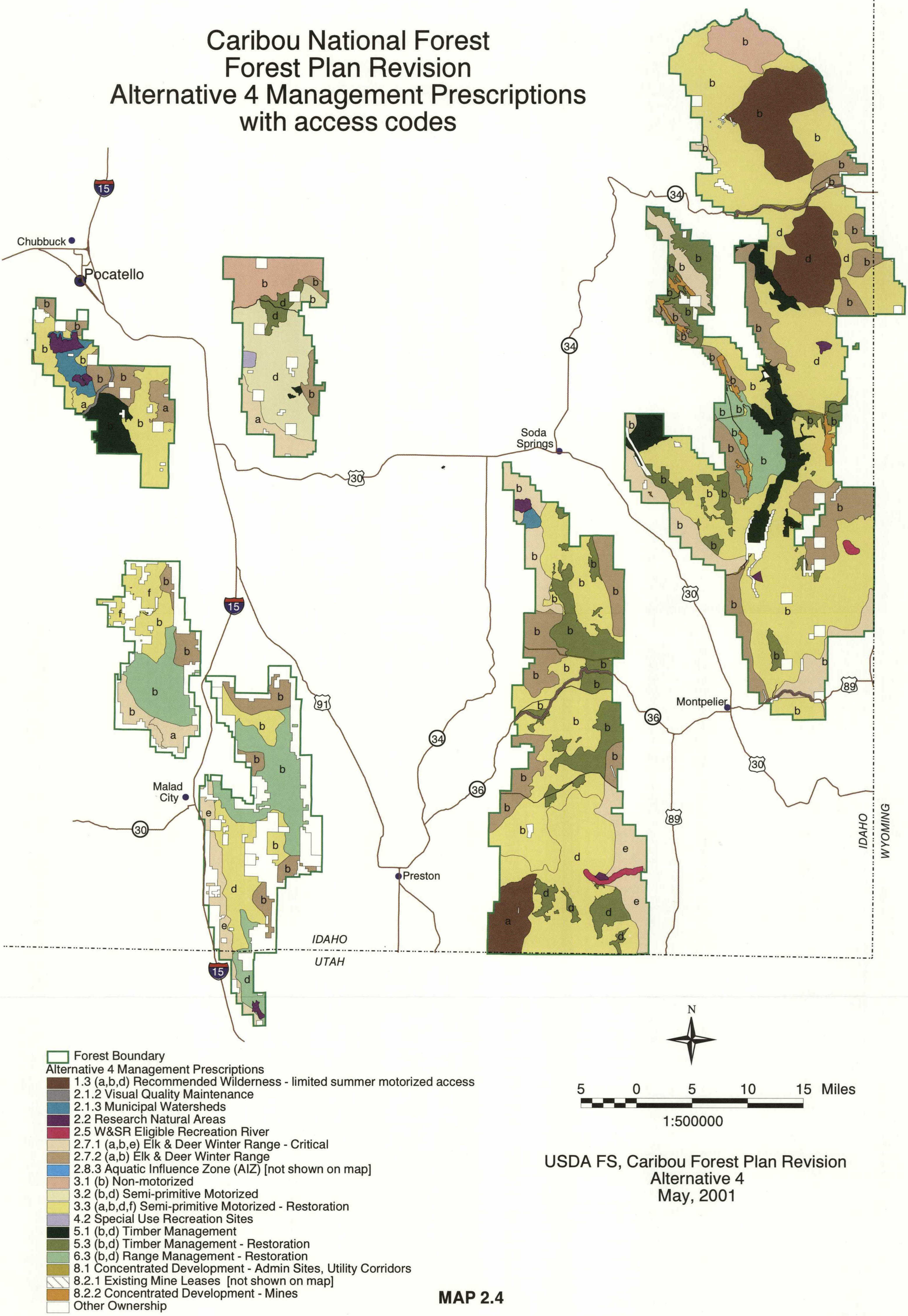


USDA FS, Caribou Forest Plan Revision
Alternative 4
May, 2001

MAP 2.4

ALTERNATIVE 5

THEME

Alternative 5 proposes to manage forest resources to increase recreation opportunities, scenic beauty, and healthy landscapes. It reflects the likely outcomes of managing ecosystems consistent with recreation objectives. This Alternative emphasizes the issues of economics, based on amenity values, riparian/wetland areas, aquatic habitat, water quality, motorized and non-motorized access, and wildlife.

ACCESS AND RECREATION MANAGEMENT

Year-round access opportunities would be managed to provide an array of both motorized and non-motorized experiences. Summer motorized travel would be restricted to designated routes. Non-motorized opportunities would increase, because some areas would be closed to motorized use. In some prescriptions, where appropriate, an increase in open motorized road and trail densities could occur. Approximately 35,400 acres (three percent of the Forest) would be managed for summer cross-country motorized use.

The portion of Mt. Naomi recommended for Wilderness would be managed for non-motorized winter travel. Additionally, the backside of the Pebble Creek Ski Area near Pocatello would be managed for non-motorized winter travel. In some cases, winter motorized travel would be restricted to designated routes in areas where this activity would conflict with wildlife needs. Environmental education and interpretation would be emphasized.

Developed and dispersed recreation opportunities would increase with demand but would be compatible with protection of riparian areas and big game habitat.

ECONOMICS

Economic outcomes would be the result of managing forest resources to provide a high level and wide array of recreational experiences. Amenity values, such as recreation, huntable and viewable wildlife, environmental education, resource interpretation, and visual quality, would be emphasized.

ECOSYSTEM MANAGEMENT

Disturbances

Disturbances would be permitted to operate naturally, where recreation values would not be unduly jeopardized. Insect and disease disturbances would be allowed to play their natural role where appropriate and desirable. Prescribed fire and wildland fire would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would be allowed to burn in other areas to benefit resource values.

Forested Vegetation

Conifer sites, particularly mixed conifer, aspen/conifer, and aspen, would be managed to maintain thirty to fifty percent of these acres in a mature/old age structure. Approximately 25,700 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, harvest, thinning or other methods that would achieve resource objectives.

Aspen would be treated to restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 100 years.

- *Table 2. 46. Alternative 5. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	30-50%	550,000	25,700	19,200	6,500

1 A component of these acres is likely to be non-lethal fire.

Non-Forested Vegetation

Sagebrush and mountain shrub would be managed to allow thirty to fifty percent of the acres to remain in greater than fifteen percent canopy cover. Approximately 70,800 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected within 50-75 years and within 100 years on tall forb sites.

- *Table 2. 48. Alternative 5. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	50%	40%	100 years	70,800

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Livestock grazing would be managed to meet recreation goals. When conflicts arise between recreation and livestock grazing, livestock grazing would be mitigated to meet recreation needs. Grazing would be phased out on an opportunity basis in the Scout Mountain area because of conflicts with recreation. Where grazing is the primary cause for less than satisfactory conditions, grazing would not be allowed on non-functional streams or stream segments and/or streams that are listed as water quality limited under 303(d) of the Clean Water Act. Livestock grazing would be managed through forest-wide livestock forage utilization levels as shown below. (For additional information, see Chapter 4 Livestock Grazing):

- *Table 2. 50. Alternative 5. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
Riparian Properly Functioning Condition – on greenline **Herbaceous** **Browse** **Stubble Height**	30%-50% Site-specific Greater than 6 inches
Riparian (At risk) – on greenline **Herbaceous** **Browse** **Stubble Height**	30%-50% Site-specific Greater than 6 inches
Riparian (Non-Functioning) – on greenline **Herbaceous** **Browse** **Stubble Height**	Reduced grazing/no grazing allowed[2] Reduced grazing/ no grazing allowed[2] Reduced grazing/ no grazing allowed[2]
Percent Bank Disturbance	15%[1]
Percent Soil Disturbance	Does not apply
Winter Range Browse	10%-20%
Winter Range Herbaceous	35%-45%

1 Less than 15% if the stream is functioning at risk.
2 Where livestock grazing is determined to be the primary cause for the less than satisfactory conditions.

Livestock suitability is the same as Alternatives 1 through 4. Additional areas such as dispersed recreation sites are considered not suitable for livestock grazing. (For additional information, see Chapter 4 Livestock Grazing).

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 5, an adaptive approach to mining operations, reclamation, and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous substance management would be adaptively applied using research and monitoring activities to develop and implement Best Management Practices. Releases of hazardous substances would be managed to prevent releases in excess of established state and federal standards. Because of the Roadless Conservation Initiative, unleased phosphate deposits in inventoried roadless areas would not be recommended for leasing.

Riparian/Wetland Areas, Water Quality and Aquatic Habitat Management

Riparian and aquatic resources would be managed to maintain or improve the functioning conditions of streams and riparian areas. Reduced livestock use levels would be implemented on streams that are functioning at risk, and grazing could be prohibited on non-functioning streams. Watershed protection would be a primary focus of management activities, while allowing other uses that contribute to the improvement of water quality limited streams, Sensitive Species, watershed integrity, riparian areas, stream channels and aquatic habitat conditions. (See Table 2.23 under Livestock Grazing for riparian utilization.)

Timber Sale Program

Silvicultural methods and vegetation management, particularly on mixed conifer, aspen/conifer, and aspen sites, would focus on forest appearance, visual quality, public safety, forest health, and wildlife habitat. Forested vegetation management activities would be allowed on a limited basis on some forested lands unsuited for timber production to achieve ecological, visual quality and wildlife habitat objectives.

- *Table 2. 52. Proposed Timber Program Emphasis in Alternative 5.*

Alternative 5	Measurement
Suitable acres	48,400 acres
Types of vegetation emphasized in treatments	Mixed conifer, aspen/conifer, aspen
Suitable forested acres harvested in the 1st decade	6,100 acres
Unsuitable forested acres harvested in the 1st decade	400 acres
Estimated Allowable Sale Quantity per decade	20 mmbf
Fuelwood harvest per decade	10 thousand cords
Miles of road needed for harvest activities per decade	16 miles
Silvicultural methods allowed	All methods
Use of even-age management	Low
Regeneration	2,100 acres
Pre-commercial thinning	1,200 acres

Recommended Wilderness and Roadless Area Management

Under Alternative 5, a total of approximately 93,100 acres would be recommended for Wilderness. Those portions of the Mt. Naomi and Worm Creek Roadless Areas (~30,000 acres)

recommended in 1985 would be retained and managed to protect and maintain Wilderness characteristics. In addition, a portion of the Caribou City Roadless Area (as defined in Alternative 4) also would be recommended for Wilderness.

Of these acres, portions of Mt. Naomi and Caribou City recommended for Wilderness would be managed for summer non-motorized use. Approximately 16,000 acres recommended for Wilderness in the Worm Creek Roadless Area would be managed for summer motorized recreation on designated routes. The Mt. Naomi portion recommended for Wilderness would continue to be managed for non-motorized winter travel. Those portions of Worm Creek and Caribou City recommended for Wilderness would be open to motorized winter travel.

The Roadless Area Conservation Rule (RACR) would be applied in this Alternative. Road construction and reconstruction would not be allowed. Timber harvest inside inventoried roadless areas would only occur if RACR criteria for such management activity could be met.

Roadless areas managed for summer non-motorized recreation would increase over current levels. Roadless areas managed for summer and winter motorized recreation would decrease over current levels.

Wildlife Habitat Management

Wildlife habitats would be managed to maintain or improve habitat to support high populations of huntable and watchable wildlife. They would also be managed to ensure viable and continuing populations on the Forest. Wildlife habitat management would focus on developing effective habitat through vegetation treatments in habitats-at-risk, establishment of upland and riparian livestock utilization levels, and establishment of road/motorized trail densities. Protection of unique habitats and recovery of Threatened and Endangered Species would occur thru the appropriate recovery process. Big game winter range would be emphasized in selected areas through livestock forage utilization and access management, where it is identified.

A minimum of twenty percent of the forested acres in each 5th code HUC[4] would be maintained in late seral/old growth conditions. Fifteen percent of the forested acres in each HUC would be managed as old growth or for old growth recruitment where sufficient old growth currently does not exist.

A moderate emphasis would be placed on maintaining or improving stronghold habitats for wildlife and fish addressed in specific recovery plans. Moderate emphasis would be placed on retaining and improving wildlife corridors.

[4] A level of Hydrologic Unit Code (HUC) mapping hierarchy developed by the U.S. Geologic Service and used for the Interior Columbia Basin Ecosystem Management Project (ICEBMP) to map geographic boundaries of watersheds at various scales.

Alternative 5

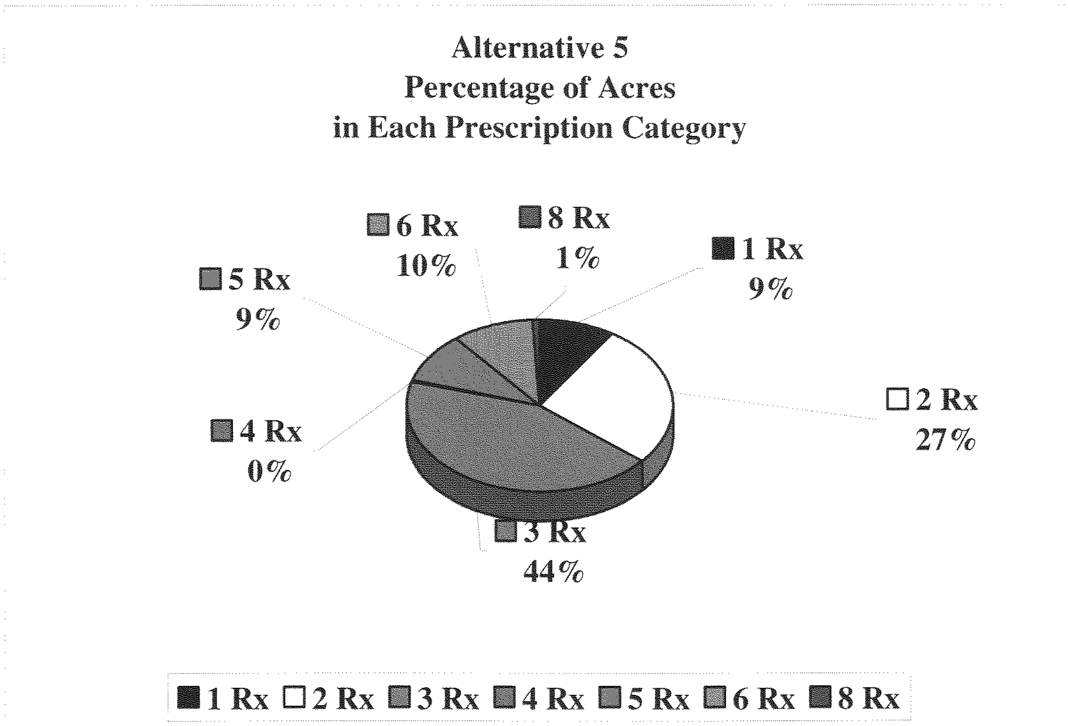
- *Table 2. 54. Prescription Acres in Alternative 5.*

Prescription Category	Prescription Name	RX No. /Access	Acres in Prescription
Wilderness Back Country	Mt. Naomi year-round non-motor	1.3(a)	14,200
	Caribou City; summer non-motor, winter motor	1.3(b)	64,500
	Worm Creek; year-round motor	1.3(d)	15,600
Special Management Area	Visual Quality Maintenance	2.1.2	4,200
	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (forage), motor designated routes	2.7.1(b)	85,500
	Winter range, motor designated routes	2.7.2(b)	123,100
	Aquatic Influence Zone	2.8.3	54,200
Semi-primitive non-intensive	Year-round non-motor	3.1(a)	52,300
	Summer motor trails; winter non-motor	3.2(a)	1,200
	Year-round motor	3.2(b)	112,700
	Scout Mountain, motor	3.2.1	10,600
	Year-round motor	3.3(b)	185,000
	Cross-country; year-round motor	3.3(c)	13,800
	Summer non-motor; winter motor	3.3(f)	1,900
	Summer seasonal closures; winter motor.	3.3(e)	73,900
Developed/Dispersed Recreation	Special Use Permit recreation sites access	4.2	1,100
	Dispersed camping access	4.3	2,000
Timber Restoration	Year-round motor	5.3(b)	47,600
	Cross-country; year-round motor	5.3(c)	11,700
	Summer seasonal closures; winter motor.	5.3(e)	19,800
	Summer big game habitat; lower OMRD for deer/elk	5.4(d)	19,300
Rangeland Restoration	Year-round motor	6.3(b)	95,800
	Cross-country; year-round motor	6.3(c)	2,400
	Summer non-motor; winter motor	6.3(f)	5,800
Concentrated Development Area	Utility corridors, commercial and administrative sites	8.1	100
	Existing undeveloped leases	8.2.1	2,800
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

- *Table 2. 56 Probable Treatments in Alternative 5.*

Probable Treatments in the First Decade	Alternative 5
Suitable Forested Acres Harvested	6,100
Unsuitable Forested Acres Harvested	400
Forested Acres Treated with Fire	19,200
Subtotal of Forested Acres Treated	25,700
Non-Forested Acres Treated with Fire	70,800
Total Acres Treated In Decade	96,500

- *Figure 2. 5 Percentage of Acres in each Prescription Category in Alternative 5.*



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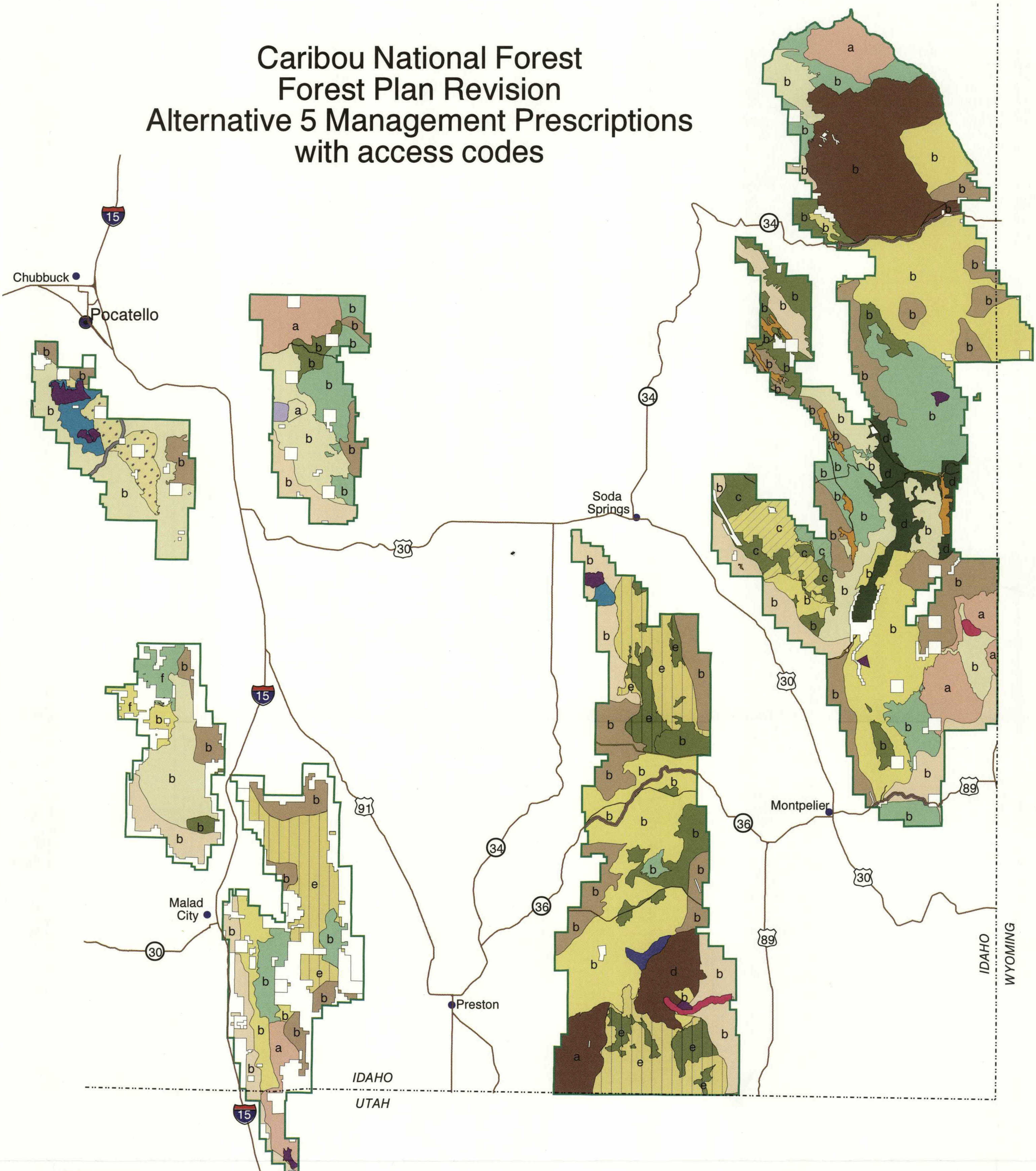

Forest Boundary

Areas Open to Motorized Cross-Country Travel

Alternative 5 Management Prescriptions

- 1.3 (a,b,d) Recommended Wilderness - limited summer motorized access
- 2.1.2 Visual Quality Maintenance
- 2.1.3 Municipal Watersheds
- 2.2 Research Natural Areas
- 2.5 W&SR Eligible Recreation River
- 2.7.1 (b) Elk and Deer Winter Range - Critical
- 2.7.2 (b) Elk and Deer Winter Range
- 2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
- 3.1 (a) Nonmotorized
- 3.2 (a,b) Semi-primitive Motorized
- 3.2.1 Semi-primitive Motorized - no grazing
- 3.3 (b,c,f) Semi-primitive Motorized - Restoration
- 3.3 (e) Semi-primitive Motorized - Restoration, seasonal closure
- 4.2 Special use Recreation Sites
- 4.3 Dispersed Camping Management
- 5.3 (b,c) Forest Management -Restoration
- 5.3 (e) Forest Management - Restoration, seasonal closure
- 5.4 Summer Big Game Habitat
- 6.3 (b,c,f) Range Management - Restoration
- 8.1 Concentrated Development - Admin Sites, Utility Corridors
- 8.2.1 Existing Mine Leases [not shown on map]
- 8.2.2 Concentrated Development - Mines
- Other Ownership

N

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USDA FS, Caribou Forest Plan Revision
Alternative 5
May, 2001

MAP 2.5

ALTERNATIVE 6

THEME

Alternative 6 was developed from a proposed Alternative submitted by the Greater Yellowstone Coalition and other environmental organizations. This Alternative would emphasize wilderness areas and preservation of inventoried roadless areas. A significant portion of the Forest's roadless areas would be recommended for Wilderness designation. Timber harvest and grazing would be managed and permitted in suitable areas when it is demonstrated that those activities would not damage other ecological functions.

ACCESS AND RECREATION MANAGEMENT

Recreation use, including both summer and winter motorized and non-motorized use outside of recommended Wilderness Areas, would be managed to provide a very high level of protection for aquatic systems, soils, plants, and wildlife. Summer cross-country motorized travel would be eliminated and all motorized use would be restricted to designated routes. While a variety of recreation uses would be provided, this alternative emphasizes non-motorized use. Generally, no new motorized roads or trails would be permitted unless an equal length is closed within the same prescription area. No single-track trail would be widened to allow two-track motorized vehicles. Trails and roads open to motorized use would be closed immediately if damage to water quality, wildlife, soils, or vegetation occurs.

Cross-country motorized winter travel would be eliminated in recommended Wilderness Areas and on the back-side of the Pebble Creek Ski Area in this Alternative. Additionally, in some areas motorized winter use would be seasonally restricted to designated routes in big game winter range.

Developed recreation would be maintained at current levels. Dispersed recreation would emphasize non-motorized opportunities in this Alternative.

ECONOMICS

Economic benefits to individuals or corporations would be an indirect effect of Forest management. Economics would not drive forest management decisions for resource uses. This Alternative would manage forest resources to protect areas with high Wilderness values and the Forest's roadless areas not recommended for Wilderness.

ECOSYSTEM MANAGEMENT

Disturbances

Natural processes, such as fire and disease, would be allowed to occur throughout the Forest, except where human lives are threatened. Identified "ecological hot spots" would be protected to insure that the values and resources which led to their identification are maintained and enhanced. Vegetation outside recommended Wilderness and roadless areas would be managed where it can be clearly demonstrated that ecological values are restored or maintained. Vegetation management would not be used in attempts to mimic natural processes. Wildland fire use and

prescribed fire would be reintroduced into the ecosystem forest-wide where appropriate, needed, and effective.

VEGETATION STRUCTURE AND COMPOSITION

Forested Vegetation

Conifer sites inside recommended Wilderness Areas would be managed through natural succession and disturbance processes. Sites outside of recommended Wilderness Areas, particularly mixed conifer, aspen/conifer and aspen, would be managed to maintain fifty percent of these acres in a mature/old age structure. Approximately 25,700 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Aspen would be treated to restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 100 years.

- *Table 2. 57. Alternative 6. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) Shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	Natural – inside recommended Wilderness; 50% -outside recommended Wilderness	550,000	25,700	20,800	4,900

1 A component of these acres is likely to be non-lethal fire.

Non-Forested Vegetation

Sagebrush and mountain shrub inside recommended Wilderness Areas would not be treated. Acres outside of recommended Wilderness would be managed to retain or maintain more than fifty percent of the acres in greater than fifteen percent canopy cover. Approximately 60,000 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected within 100 years and within 100 years on tall forb sites.

- *Table 2. 59. Alternative 6. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	>50%	>50%	100 years	60,000

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Rangelands would be managed to restore and protect aquatic systems, soils, plants, and wildlife. When conflicts arise between recreation and protection of the above referenced resources, livestock grazing would be modified to meet other resource needs and values. No treatments would be allowed to increase forage production, such as seedings or other vegetative manipulations for domestic livestock. Water developments, such as pipelines, troughs, and upland spring developments, are allowed unless it could be demonstrated that increased upland usage by domestic livestock would not lead to increased impacts on upland soils, vegetation, or important wildlife habitat. Livestock utilization levels would be established as follows. (For additional information, see Chapter 4 Livestock Grazing.)

- *Table 2. 61. Alternative 6. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates[1]
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
Riparian Properly Functioning Condition – entire riparian area **Herbaceous** **Browse** **Stubble Height**	20%-65% based on site-specific analysis 40%-50% based on site-specific analysis 6-inch minimum
Riparian (At risk) – entire riparian area **Herbaceous** **Browse** **Stubble Height**	20%-45% based on site-specific analysis 40%-50% based on site-specific analysis 6-inch minimum
Riparian (Non-Functioning) – entire riparian area **Herbaceous** **Browse** **Stubble Height**	20-40% based on site-specific analysis 40%-50% based on site-specific analysis 6-inch minimum
Percent Bank Disturbance	10%-25% based on site-specific analysis
Percent Soil Disturbance	5%-20% based on site-specific analysis
Winter Range Browse	10%-20%
Winter Range Herbaceous	35%-45%

1 The use of any specific parameter, such as percent utilization, stubble height, or bank disturbance, depends on a site-specific analysis. Until such analysis is completed, except for winter range utilization criteria, the livestock utilization rate, soil disturbance, and bank disturbance criteria described in Alternative 2 will be used.

Livestock suitability is the same as Alternative 5 with additional areas such as Yellowstone and Bonneville cutthroat trout strongholds, considered not suitable for livestock grazing. (For additional information, see Chapter 4 Livestock Grazing).

Mining Operations, Reclamation, and Hazardous Substance Management

Minerals management would be very prescriptive with detailed standards in the Plan. This is a conservative approach, incorporating current best management practices and other measures designed to eliminate any chance release of hazardous substances. Management direction changes would require an amendment to the Plan. The detailed direction in the Forest Plan would include such standards as backfilling all pits, placing center waste shales and other waste rocks containing potentially hazardous materials above groundwater level, and capping backfilled pits with overburden material to help prevent selenium uptake in plants. Unleased phosphate deposits in inventoried roadless areas would not be recommended for leasing.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian areas and watersheds would be aggressively managed to maintain/improve water quality and aquatic ecosystems and to restore areas in degraded condition. Stringent riparian livestock forage utilization levels for shrubs and herbaceous vegetation would be established, as would special emphasis zones for riparian vegetation and aquatic habitats. Stubble height at the end of the grazing period would not be less than six inches within the entire riparian zone. (See Livestock Table 2.28 for riparian utilization.)

Timber Sale Program

Outside of areas recommended for Wilderness and inventoried roadless areas, timber harvest, particularly in mixed conifer, aspen/conifer, and aspen, would be a by-product of vegetation treatments when it is shown that they have been designed to prevent excessive damage to other forest resources, such as wildlife habitat, old growth forests, water quality, and recreation. No timber harvest would be allowed on unsuited lands.

- *Table 2. 63. Proposed Timber Program Emphasis in Alternative 6.*

Alternative 6	Measurement
Suitable acres	38,700 acres
Types of vegetation emphasized in treatments	Mixed conifer, aspen/conifer, aspen
Suitable forested acres harvested in the 1st decade	4,900 acres
Unsuitable forested acres harvested in the 1st decade	0 acres
Estimated Allowable Sale Quantity per decade	17 mmbf
Fuelwood harvest per decade	8 thousand cords
Miles of road needed for harvest activities per decade	7 miles
Silvicultural methods allowed	All methods
Use of even-age management	Low
Regeneration	1,700 acres
Pre-commercial thinning	1,000 acres

Recommended Wilderness and Roadless Area Management

Portions of Caribou City, Stump Peak, Bear Creek, Elkhorn Mountain, Red Mountain, Gannett Spring Creek, Mt. Naomi, and Worm Creek Roadless Areas would be recommended for inclusion in the National Wilderness Preservation System. Approximately 344,350 acres would be recommended for Wilderness from these areas. Areas recommended for Wilderness would be managed for non-motorized summer travel. Summer motorized use would not be allowed. Winter motorized travel in recommended areas would be restricted to designated routes, except in the Mt. Naomi area, which would be managed for non-motorized recreation.

Roadless areas not recommended for Wilderness would be managed in accordance with the recently approved Roadless Area Conservation Rule. Road construction and reconstruction would not be allowed.

Wildlife Habitat Management

Wildlife habitat management would maintain habitat quality over the short term for species-at-risk, including Threatened, Endangered, Proposed, and Sensitive Species and other identified species-at-risk. Habitat for hunted species, such as big game and upland birds, would be managed to maintain or restore habitat quality. Big game winter range would be emphasized through livestock forage utilization and access management, where it is identified.

A minimum of twenty-five percent of the forested acres in each 5th code HUC would be maintained in late seral/old growth conditions (of which twenty percent would be managed as old growth or old growth recruitment where sufficient old growth currently does not exist). These

acres would be maintained in larger blocks where feasible. Sagebrush stands would be managed in blocks of greater than 250 acres, where possible.

A high emphasis would be placed on maintaining or improving stronghold habitats for wildlife and fish addressed in specific recovery plans. High emphasis would be placed on retaining and improving wildlife corridors that connect to the Targhee to the north, the Bridger-Teton to the east and Wasatch-Cache to the south.

Alternative 6

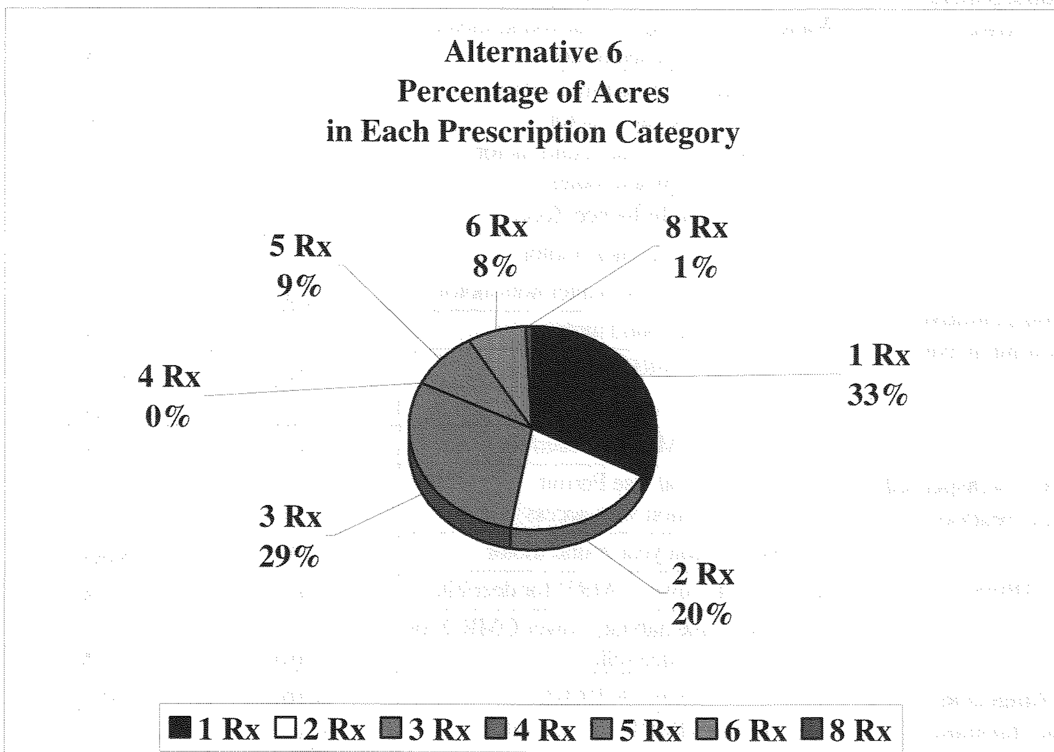
- *Table 2. 65. Prescription Acres in Alternative 6.*

Prescription Category	Prescription Name	RX No. /Access	Acres in Prescription
Wilderness Back Country	Mt. Naomi—year-round non-motor	1.3(a)	27,900
	Summer non-motor; winter motor designated routes	1.3(e)	314,000
Special Management Area	Visual Quality Maintenance	2.1.2	4,200
	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (forage), year-round motor designated routes	2.7.1(b)	75,700
	Winter range, summer motor; winter non-motor	2.7.2(a)	5,000
	Winter range, year-round motor designated routes	2.7.2(b)	71,400
	Aquatic Influence Zone	2.8.3	37,700
Semi-primitive non-intensive	Year-round non-motor	3.1(a)	33,600
	Summer motor trails; winter non-motor	3.2(a)	6,800
	Year-round motor	3.2(b)	40,700
	Lower OMRD for deer/elk	3.2(d)	79,800
	Year-round motor	3.3(b)	47,500
	Lower OMRD for deer/elk	3.3(d)	97,600
Developed/Dispersed Recreation	Special Use Permit recreation sites access	4.2	1,100
Timber	Restoration year-round motor	5.3(b)	18,800
	Restoration, Lower OMRD for deer/elk	5.3(d)	36,900
	Summer big game habitat, Lower OMRD for deer/elk	5.4(d)	38,700
Rangeland Restoration	Year-round motor	6.3(b)	800
	Lower OMRD for deer/elk	6.3(d)	78,100
	Summer non-motor; winter motor	6.3(f)	1,900
Concentrated Development Area	Utility corridors, commercial and Administrative sites	8.1	100
	Existing leases, undeveloped	8.2.1	2,800
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

- *Table 2. 67 Probable Treatments in Alternative 6.*

Probable Treatments in the First Decade	Alternative 6
Suitable Forested Acres Harvested	4,900
Unsuitable Forested Acres Harvested	0
Forested Acres Treated with Fire	20,800
Subtotal of Forested Acres Treated	25,700
Non-Forested Acres Treated with Fire	60,000
Total Acres Treated In Decade	85,700

- *Figure 2. 6 Percentage of Acres in each Prescription Category in Alternative 6.*



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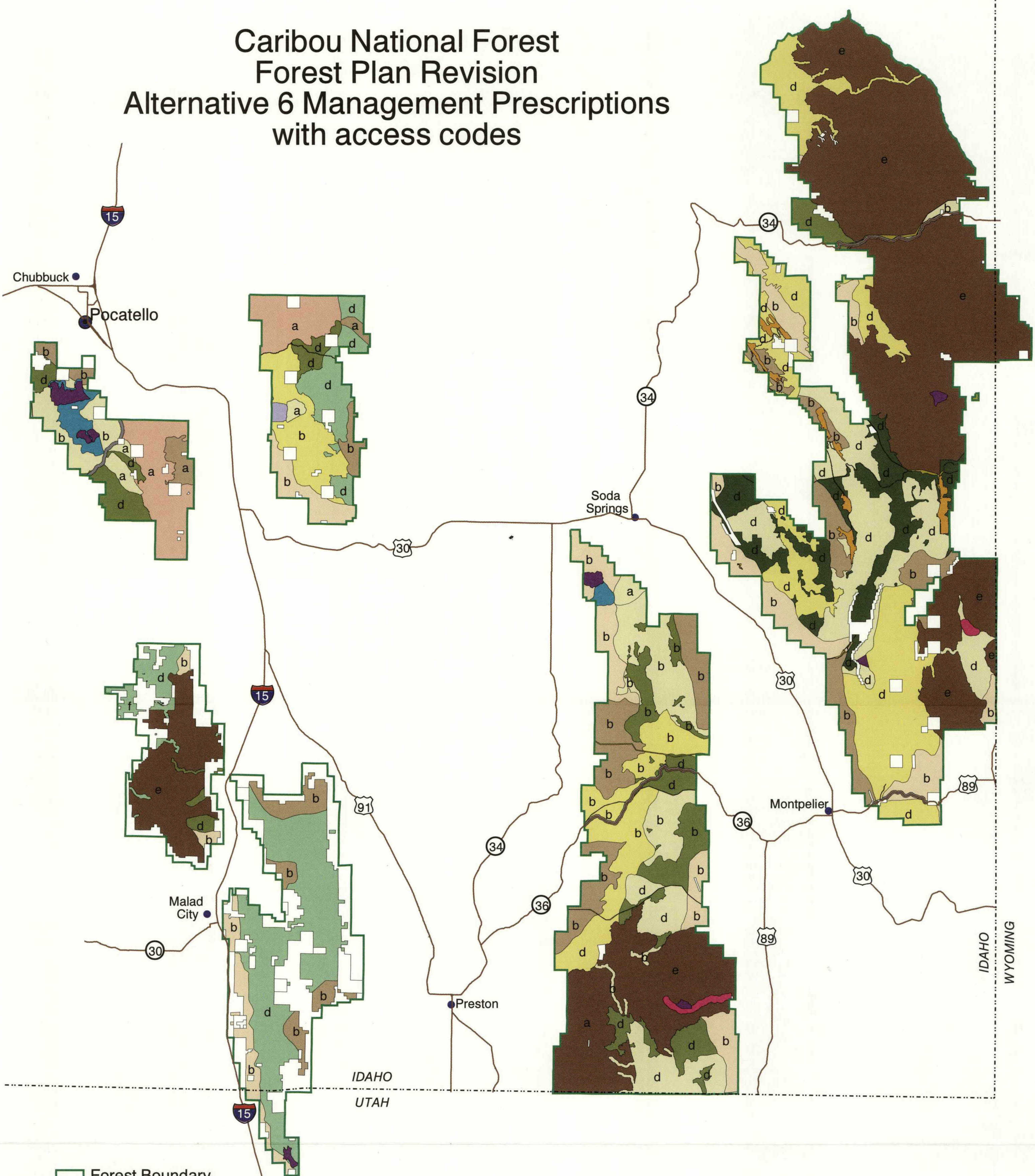


Forest Boundary

Alternative 6 Management Prescriptions

- 1.3 (a,e) Recommended Wilderness - limited summer motorized access
- 2.1.2 Visual Quality Maintenance
- 2.1.3 Municipal Watersheds
- 2.2 Research Natural Areas
- 2.5 W&SR Eligible Recreation River
- 2.7.1 (b) Elk and Deer Winter Range - Critical
- 2.7.2 (a,b) Elk and Deer Winter Range
- 2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
- 3.1 (a) Nonmotorized
- 3.2 (a,b,d) Semi-primitive Motorized
- 3.3 (b,d) Semi-primitive Motorized - Restoration
- 4.2 Special Use Recreation Sites
- 5.3 (b,d) Forest Management -Restoration
- 5.4 (d) Summer Big Game Habitat
- 6.3 (b,d,f) Range Management - Restoration
- 8.1 Concentrated Development - Admin Sites, Utility Corridors
- 8.2.1 Existing Mine Leases [not shown on map]
- 8.2.3 Concentrated Development - Mines
- Other Ownership

N

5 0 5 10 15 Miles

1:500000

USDA FS, Caribou Forest Plan Revision
Alternative 6
May, 2001

MAP 2.6

ALTERNATIVE 7—Preferred Alternative in the Draft EIS

THEME

Alternative 7 proposes to manage forested and non-forested resources to move towards their historic range of variation (HRV). This Alternative would manage resources using a mix of restoration strategies, including timber harvest, thinning, fire, and grazing management. It proposes vegetation management, road rehabilitation, prescribed fire, and wildfire. It emphasizes the issues of ecosystem management, riparian/wetland areas, minerals management, aquatic habitat, water quality, wildlife, and motorized/non-motorized access. **Alternative 7 was the agency's Preferred Alternative in the Draft EIS. It is not the agency's selected alternative.**

ACCESS AND RECREATION MANAGEMENT

A variety of recreation opportunities would be available in this Alternative. Approximately 35,350 acres (three percent) would be open to cross-country summer motorized use. In some management prescription areas a decrease in open road and motorized trail density would occur.

Winter motorized travel would be restricted to designated routes in big game winter range. Winter motorized use would not be allowed on the backside of the Pebble Creek Ski Area. Portions of Mt. Naomi and Caribou City would be open to motorized winter travel.

Developed and dispersed recreation opportunities would be provided while maintaining and protecting watershed, soils, riparian areas, and big game winter ranges.

ECONOMICS

Economic outcomes would be the result of managing forest resources to restore natural processes and functions over the long-term.

ECOSYSTEM MANAGEMENT

Disturbances

Disturbances would be allowed to operate naturally in order to maintain or restore ecological processes and functions. Insect and disease disturbances would be allowed to play their natural role where appropriate and desirable, although epidemic disturbances generally would be controlled. Prescribed fire, mechanical treatment, and wildland fire for resource benefit would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would be allowed to burn in other areas to benefit resource values.

VEGETATION STRUCTURE AND COMPOSITION

Forested Vegetation

Conifer sites, particularly mixed conifer, aspen/conifer, and aspen, would be managed to maintain thirty to forty percent of these acres in a mature/old age structure. Approximately 34,100 acres

would be treated over the decade. Treatment methods would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Aspen would be treated to moderately restore the aspen component on the forest to historical levels. Treatments would include prescribed fire, wildland fire use, harvest, thinning, or other methods that would achieve resource objectives.

Desired Future Conditions for conifer and aspen sites are expected to be achieved within 100 years.

- *Table 2. 68. Alternative 7. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated (Fire/Harvest per decade) shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Total Acres Treated Per decade	Estimated Acres Treated by Fire[1] Per decade	Estimated Acres Treated by Harvest Per decade
50-80%	30-40%	550,000	34,100	26,800	7,300

1 A component of these acres is likely to be non-lethal fire.

Non-Forested Vegetation

Sagebrush and mountain shrub would be managed to allow thirty to fifty percent of the acres to remain in greater than fifteen percent canopy cover. Approximately 79,750 acres would be treated over the decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, or other methods that would achieve the desired outcome. Herbicide treatments and seedings would be permitted at the site-specific level based on ecological need.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability.

The range of Desired Future Conditions in sagebrush and mountain shrub would be expected within 50-75 years and within 100 years on tall forb sites.

- *Table 2. 70. Alternative 7. Non-forested Vegetation Conditions, Goals, and Proposed Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	30-50%	40%	50-75 years	79,750

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities would be permitted after a site-specific analysis.

LIVESTOCK GRAZING

Livestock grazing would be managed to maintain or restore watersheds, aquatic systems, soils, plants and animals. Livestock grazing would be managed through forest-wide livestock forage utilization levels as shown below. (For additional information, see Chapter 4 Livestock Grazing):

- *Table 2. 72. Alternative 7. Estimated Livestock Utilization Levels by Type of Forage.*

Type of Forage	Livestock Utilization Rates[1]
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
Riparian Properly Functioning Condition – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-65% based on site-specific analysis 50% based on site-specific analysis 2-6 inches based on site-specific analysis
Riparian (At risk) – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-45% based on site-specific analysis 50% based on site-specific analysis 3-8 inches based on site-specific analysis
Riparian (Non-Functioning) – on greenline and/or the entire AIZ[2] **Herbaceous** **Browse** **Stubble Height**	20-40% based on site-specific analysis 40%-50% based on site-specific analysis 4-8 inches based on site-specific analysis
Percent Bank Disturbance (ANNUAL)	10%-25% based on site-specific analysis
Percent Soil Disturbance	5%-15% based on site-specific analysis
Winter Range Browse	10%-20%
Winter Range Herbaceous	35%-45%

1 The use of any specific parameter, such as percent utilization, stubble height, or bank disturbance, depends on a site-specific analysis, except for both winter range utilization criteria. The procedure for this analysis is outlined in the Caribou Grazing Implementation Guide.

2 Aquatic Influence Zone (AIZ).

The areas considered unsuitable in Alternatives 1-3 would also be unsuitable in this alternative. In addition, tarweed sites, parts of the dispersed recreation areas, Elk Valley Marsh, St. Charles and other areas would be considered unsuitable for grazing.

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 7, an adaptive approach to mining operations, reclamation, and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous substance management would be adaptively applied using research and monitoring activities to develop and implement Best Management Practices. Releases of hazardous substances would be managed to prevent releases in excess of established state and federal standards. Because of the Roadless Conservation Rule, unleased phosphate deposits in inventoried roadless areas would not be recommended for leasing.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian areas and watersheds would be aggressively managed through detailed guidance to maintain water quality and aquatic ecosystems and to restore degraded conditions where they exist. The primary focus of management activities would be on achieving riparian properly functioning condition, watershed protection, and restoration.

Streams that are in properly functioning condition would be managed to maintain or improve that condition. Streams that are functioning but "at risk" of further degradation would have more stringent standards and guidelines applied. Streams considered not functioning would have the most prohibitive standards and guidelines applied. Additional standards and guidelines would be applied to streams identified by the State of Idaho as water quality limited or contain Threatened and Endangered Species. (See Livestock Grazing Table 2.33 for riparian utilization.)

Timber Sale Program

Vegetation management and silvicultural methods would focus on saw timber and wood fiber, particularly on mixed conifer, aspen/conifer, and aspen sites, as a by-product of vegetation treatments designed to move closer to the historical range of variation. Forested vegetation management activities would be allowed on a limited basis on some forested lands unsuited for timber production to achieve ecological objectives.

- *Table 2. 74. Proposed Timber Program Emphasis in Alternative 7.*

Alternative 7	Measurement
Suitable acres	54,000 acres
Types of vegetation emphasized in treatments	Mixed conifer, aspen/conifer, aspen
Suitable forested acres harvested in the 1st decade	6,800 acres
Unsuitable forested acres harvested in the 1st decade	500 acres
Estimated Allowable Sale Quantity per decade	22 mmbf
Fuelwood harvest per decade	11 thousand cords
Miles of road needed for harvest activities per decade	18 miles
Silvicultural methods allowed	All methods
Use of even-age management	Moderate
Regeneration	2,300 acres
Pre-commercial thinning	1,300 acres

Recommended Wilderness and Roadless Area Management

Under Alternative 7, approximately 47,200 acres would be recommended for Wilderness in the Mt. Naomi and Caribou City Roadless Areas. Summer motorized travel would be allowed in areas recommended for Wilderness on existing, designated routes. Winter motorized travel would be allowed. The portion of the Worm Creek Roadless Area (~16,000 acres) recommended for Wilderness in 1985 would not be recommended in this Alternative. The Worm Creek Roadless Area would be managed as a semi-primitive motorized area (Management Prescription 3.2).

The Roadless Area Conservation Rule (RACR) would be applied in this Alternative. Road construction and reconstruction would not be allowed. Timber harvest inside inventoried roadless areas would only occur if RACR criteria for such management activity could be met.

Summer and winter motorized and non-motorized recreation opportunities in roadless areas would remain the same, except in areas of critical winter range and a portion adjacent to Pebble Creek Ski Area that will provide non-motorized recreation opportunities in the winter.

Wildlife Habitat Management

Wildlife habitat management would restore habitat quality for species-at-risk, including Threatened, Endangered, Proposed, and Sensitive Species and other identified species-at-risk. Habitat for hunted species, such as big game and upland birds, would be managed to maintain or restore habitat quality. Management actions could include vegetation treatments in habitats-at-risk, establishment of upland and riparian livestock forage utilization levels, and establishment of road/motorized trail densities. Big game winter range would be emphasized in selected areas through livestock forage utilization and access management, where it is identified.

A minimum of twenty percent of the forested acres in each 5th code HUC[5] would be maintained in late seral/old growth conditions. Fifteen percent of the forested acres in each HUC would be managed as old growth or for old growth recruitment where sufficient old growth currently does not exist. These acres would be maintained in larger blocks where feasible. Sagebrush stands would be managed in blocks of greater than 250 acres, where possible.

A high emphasis would be placed on maintaining or improving stronghold habitats for wildlife and fish addressed in specific recovery plans. Moderate emphasis would be placed on retaining and improving wildlife corridors.

[5] A level of Hydrologic Unit Code (HUC) mapping hierarchy developed by the U.S. Geologic Service and used for the Interior Columbia Basin Ecosystem Management Project (ICEBMP) to map geographic boundaries of watersheds at various scales.

Alternative 7

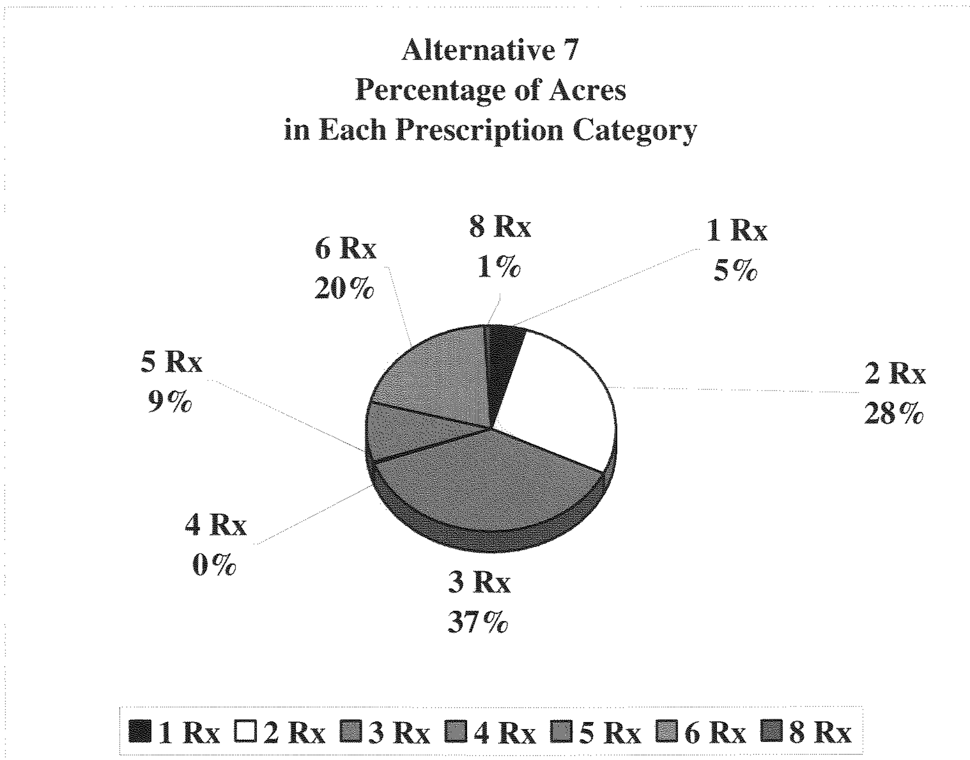
- *Table 2. 76. Prescription Acres in Alternative 7.*

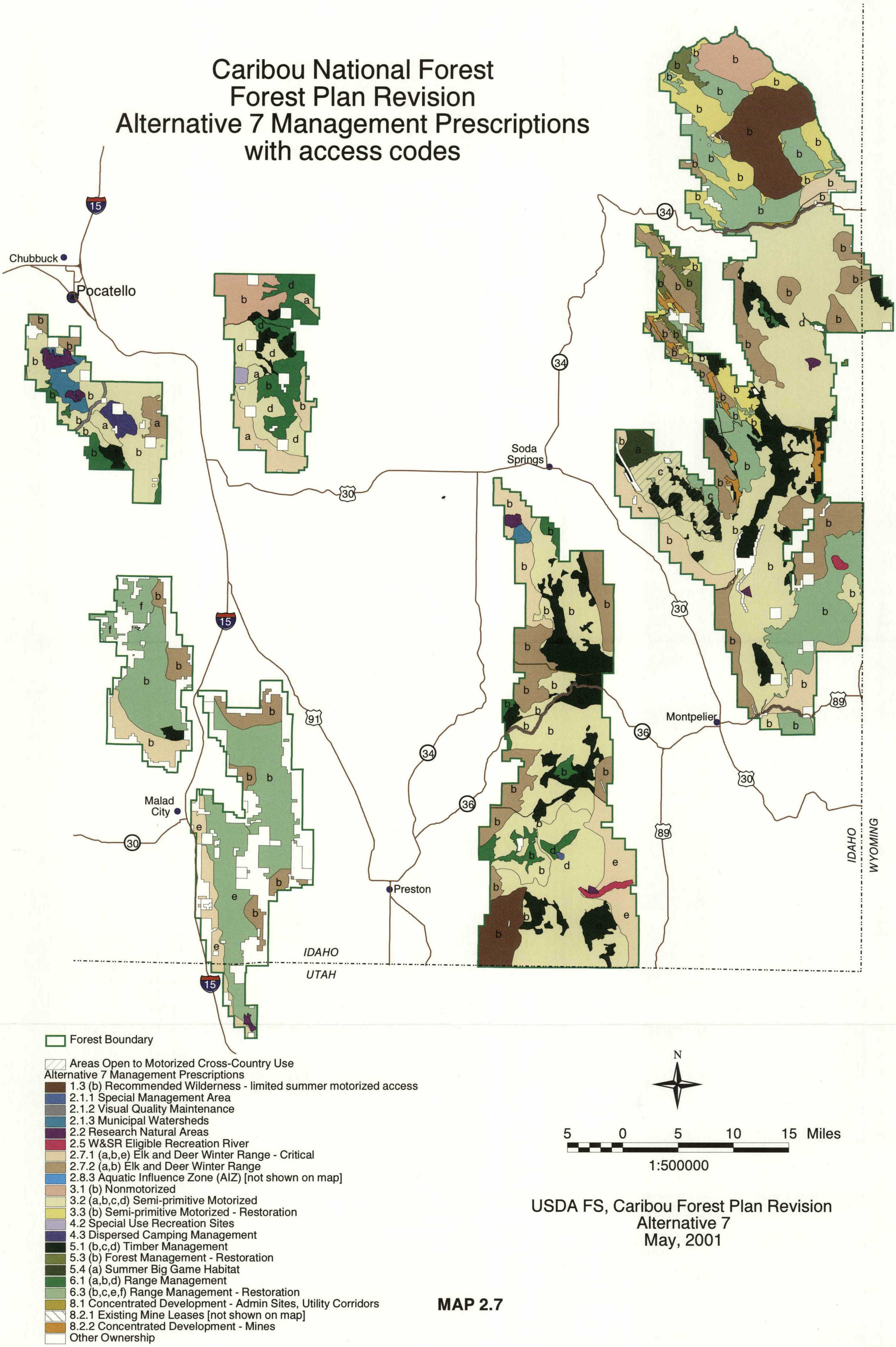
Prescription Category	Prescription Name	RX No./Access	Acres in Prescription
Wilderness /Backcountry	Summer non-motor; winter motor	1.3(b)	47,200
Special Management Area	Special Management Area	2.1.1	200
	Visual Quality Maintenance	2.1.2	4,200
	Municipal watersheds	2.1.3	6,500
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (forage), summer motor; winter non-motor	2.7.1(a)	9,700
	Winter range (forage), year-round motor on designated routes	2.7.1(b)	52,900
	Winter range, summer motor, winter non-motor designated routes	2.7.1(e)	27,400
	Winter range, summer motor; winter non-motor	2.7.2(a)	3,800
	Winter range, year-round motor, designated routes	2.7.2(b)	119,100
	Aquatic Influence Zone	2.8.3	57,800
Semi-primitive non-intensive	Summer non-motor, winter motor	3.1(b)	24,400
	Summer motor trails; winter non-motor	3.2(a)	3,600
	Year-round motor	3.2(b)	162,200
	Cross-country; year-round motor	3.2(c)	13,900
	Year-round motor; lower OMRD for deer/elk	3.2(d)	146,600
	Year-round motor	3.3(b)	35,600
Developed/Dispersed Recreation	Special Use Permit recreation sites access	4.2	1,100
	Dispersed camping access	4.3	3,100
Timber	Year-round motor	5.1(b)	58,700
	Cross-country; year-round motor	5.1(c)	6,500
	Year-round motorized; lower OMRD for deer/elk	5.1(d)	19,200
	Restoration, year-round motor	5.3(b)	9,600
	Summer big game; lower OMRD for deer/elk	5.4(a)	4,600
Rangeland Restoration	Summer motor trails, winter non-motor	6.1(a)	100
	Year-round motor	6.1(b)	23,000
	Lower OMRD for deer/elk	6.1(d)	13,200
Rangeland Restoration	Year-round motor	6.3(b)	134,400
	Cross-country; year-round motor	6.3(c)	2,500
	Summer seasonal closures, winter motor	6.3(e)	25,700
	Summer non-motor; winter motor	6.3(f)	7,900
Concentrated Development Area	Utility corridors, commercial and admin sites	8.1	100
	Existing leases, undeveloped	8.2.1	2,800
	Active and reclaimed mines	8.2.2	6,100
Total			***1,042,200***

- *Table 2. 78 Probable Treatments in Alternative 7.*

Probable Treatments in the First Decade	Alternative 7
Suitable Forested Acres Harvested	**6,800**
Unsuitable Forested Acres Harvested	**500**
Forested Acres Treated with Fire	**26,800**
Subtotal of Forested Acres Treated	**34,100**
Non-Forested Acres Treated with Fire	**79,750**
Total Acres Treated In Decade	**113,850**

- *Figure 2. 7 Percentage of Acres in each Prescription Category in Alternative 7.*




Caribou National Forest
Forest Plan Revision
Alternative 7 Management Prescriptions
with access codes
Chubbuck
Pocatello
Soda Springs
Montpelier
Malad City
Preston
IDAHO
UTAH
WYOMING
15
30
34
36
89
91
Forest Boundary
Areas Open to Motorized Cross-Country Use
Alternative 7 Management Prescriptions
1.3 (b) Recommended Wilderness - limited summer motorized access
2.1.1 Special Management Area
2.1.2 Visual Quality Maintenance
2.1.3 Municipal Watersheds
2.2 Research Natural Areas
2.5 W&SR Eligible Recreation River
2.7.1 (a,b,e) Elk and Deer Winter Range - Critical
2.7.2 (a,b) Elk and Deer Winter Range
2.8.3 Aquatic Influence Zone (AIZ) [not shown on map]
3.1 (b) Nonmotorized
3.2 (a,b,c,d) Semi-primitive Motorized
3.3 (b) Semi-primitive Motorized - Restoration
4.2 Special Use Recreation Sites
4.3 Dispersed Camping Management
5.1 (b,c,d) Timber Management
5.3 (b) Forest Management - Restoration
5.4 (a) Summer Big Game Habitat
6.1 (a,b,d) Range Management
6.3 (b,c,e,f) Range Management - Restoration
8.1 Concentrated Development - Admin Sites, Utility Corridors
8.2.1 Existing Mine Leases [not shown on map]
8.2.2 Concentrated Development - Mines
Other Ownership
N
5 0 5 10 15 Miles
1:500000
USDA FS, Caribou Forest Plan Revision
Alternative 7
May, 2001

MAP 2.7

ALTERNATIVE 7R—Selected Alternative

THEME

In response to public comments on the Draft Environmental Impact Statement and Draft Forest Plan, Alternative 7R was developed. The alternative incorporates elements of other alternatives described in the Draft in order to address public comments. This Alternative would allow a variety of vegetation management practices, focusing on restoration of key communities such as aspen. Timber harvest would be allowed in inventoried roadless areas where appropriate.

In order to implement the Plan, the Forest will likely propose vegetation management, road rehabilitation, prescribed fire, wildland fire use, and a myriad of other activities in the next decade. The amount of activity occurring is based on current staffing levels and planning requirements, not what is needed to meet the desired future conditions. In this alternative, the desired outcome is not a number of acres treated; it is an ecological condition on the ground. Thus, probable treatment acres detailed below do not represent a ceiling or a target. The acres represent the likely accomplishments given our current social and economic environment.

This alternative emphasizes the issues of ecosystem management, riparian/wetland areas, minerals management, water quality, wildlife, and motorized/non-motorized access. It features an emphasis on adaptive management and monitoring to resolve uncertainties regarding the management of Forest resources. This adaptive strategy offers an avenue to describe and evaluate the consequences of changing conditions and knowledge. Monitoring and additional analysis are used to shape future management actions within the framework of the Forest Plan.

Alternative 7R is the agency's Selected Alternative.

ACCESS AND RECREATION MANAGEMENT

A variety of recreation opportunities would be available in this Alternative. Approximately 29,400 acres (three percent) would be open to cross-country summer motorized use. Target densities of open motorized routes (OMRD) are established across the Forest. In some prescriptions, a decrease in current open road and motorized trail density would be necessary in order to meet the target road densities. A total of 24,800 acres (3 percent of the Forest) would be closed to motorized access year-round.

Winter motorized travel would be restricted to designated routes in big game winter range. Winter motorized use would not be allowed on the backside of the Pebble Creek Ski Area or in three other areas across the Forest. Mt. Naomi and Caribou City Recommended Wilderness Areas would be open to motorized winter travel. All other areas on the Forest would be open to cross-country motorized use in winter.

Developed and dispersed recreation opportunities would be provided while maintaining and protecting watershed, soils, riparian areas, and big game winter ranges. Some of the dispersed recreation areas would be considered unsuitable for livestock grazing.

Two areas would be managed to preserve and interpret their historic attributes. Caribou City mining area and the Lander Trail Corridor would have special prescriptions applied to them.

Economics

Economic outcomes would be the result of managing forest resources to restore natural processes and functions while providing goods and services. These would be a mixture of traditional commodity uses and non-commodity uses such as recreation, wildlife viewing, fishing, etc.

Ecosystem Management

Disturbances

Disturbances would be allowed to operate naturally in order to maintain or restore ecological processes and functions. Insect and disease disturbances would be allowed to play their natural role where appropriate and desirable, although epidemic disturbances generally would be controlled. Prescribed fire, mechanical treatment including commercial timber harvest, and wildland fire would be used to manage vegetation, reduce hazardous fuels, and recycle nutrients with priority on reducing fuels near interface communities. Wildfires would be suppressed in some areas to protect public safety and resource values but would be allowed to burn in other areas to benefit resource values.

Vegetation Structure and Composition

In order to compare alternatives, the IDT developed a level of treatments that the Forest would likely propose during the life of the Plan. In Alternative 7R, the probable treatment acres were based on current staffing levels and planning requirements, not what is needed to meet the desired future conditions. Events such as wildfire would not be considered part of the treatment acres, they would be additive. In this alternative, the desired outcome is not a number of acres treated; it is an ecological condition on the ground. Thus, probable treatment acres detailed below do not represent a ceiling or a target. They are the amount we think we could accomplish in our current social and economic environment. The only ceiling is that of the Allowable Sale Quantity (ASQ).

Forested Vegetation

The emphasis for this alternative is on restoration and regeneration of aspen communities. Conifer sites, particularly aspen/conifer, would be managed to move forest vegetation towards thirty to forty percent of acres in a mature/old age structure. On sites occupied by conifers where aspen is an early seral species; conifers would be harvested to aid in the establishment of vigorous young aspen stands. Sites occupied by a majority of mature aspen would be felled or burned to encourage development of younger aspen stands through root sprouting. Overall, approximately 31,100 acres would be treated to achieve these and other desired future conditions (DFCs). Based on historic data, approximately 15,000 acres of forested vegetation are expected to be burned by escaped wildfire. It is expected to take over 100 years to achieve the DFCs under this broad scenario.

- *Table 2. 79. Alternative 7R. Existing Acres, Desired Range of Future Conditions (DRFC), Estimated Total Acres Treated shown in Percent of Mature and Old Age Classes.*

Existing Acres in Mature and Old (% of Total Forested Acres)	DRFC Mature and Old (% of Acres)	Estimated Total Acres Considered	Estimated Probable Acres Treated First decade	Estimated Acres Treated by Fire or Mechanical Means First decade	Estimated Acres Treated by Harvest First decade
50-80%	30-40%	550,000	31,100	20,000	11,100

1 A component of these acres is likely to be non-lethal fire.

Non-Forested Vegetation

Sagebrush and mountain shrub would be managed to allow at least thirty to fifty percent of the acres to remain in greater than fifteen percent canopy cover density. Based on current budgets and management emphasis, we anticipate that approximately 40,000 acres would be treated over the first decade. Treatments would include prescribed fire, wildland fire use, herbicide applications, mechanical treatments or other methods that would achieve the desired outcome. These treatment acres are based on current staffing levels and planning requirements, not what is needed to meet the desired range of future conditions. In this alternative, the desired outcome is not a number of acres treated; it is to achieve an ecological condition on the ground. For the analysis, it is estimated that an additional 3,000 acres of sagebrush and/or mountain brush would burn in escaped wildfire in the next decade. This level is based on the 31-year fire history on the Forest (Martin 2002; Caribou-Targhee NF Fire Occurrence Database). Wildfire acres burned would not count toward the 40,000 acres treatment per decade but would be additive based on ecological need and to achieve the desired range of future conditions.

Tall forb sites, where they exist, would be managed to maintain or restore sites, based on research findings. Areas that once were tall forb sites, but have lost the capability to maintain tall forb communities as a result of topsoil loss or site potential, would be managed for watershed stability. Emphasis would be given to researching effective restoration methods.

The range of Desired Future Conditions in sagebrush and mountain shrub would not be expected to be reached due to the low level of treatments. As explained above, the treatment acres were reduced in this alternative to be more realistic given current social and economic factors. If the Forest were to receive more funding for vegetation management, additional treatments would likely be proposed. Unless treatments were increased, they would not keep up with succession in sagebrush and mountain shrub communities. In tall forb sites, the range of DFC would be reached within 100 years.

- *Table 2. 81 Alternative 7R. Non-forested Vegetation Conditions, Goals, and Probable Treatments.*

Total Acres of Sagebrush and Mountain Shrub	Existing Acres Mature/Old Age Class (% of Acres)	Desired Range of Future Conditions (% of Acres)	Long-Term Goal (% of Acres)	Desired Years to Attain DRFC	Estimated Total Acres Treated Per Decade
404,500	50%	30-50%	40%	100 years	40,000

Other non-forested vegetation treatments in big tooth maple, juniper, mountain mahogany, and tall forb communities may also occur in order to move conditions closer to the historic range of variability (HRV), after a site-specific analysis.

LIVESTOCK GRAZING

Livestock grazing would be managed to maintain or restore watersheds, aquatic systems, soils, plants and animals through application of forest-wide standards shown in Table 2.38, below. In order to do this, the standards below would be incorporated into livestock grazing permits within one year of the signing of the Record of the Decision. During subsequent Allotment Management Planning, grazing standards in Aquatic Influence Zones would be determined on a site-specific level using the most recent version of the Caribou Riparian Grazing Implementation Guide. Currently, those standards would fall between the ranges shown in Table 2.39, below. For additional information, see Chapter 4 Livestock Grazing.

- *Table 2. 82 Alternative 7R. Default Livestock Utilization Levels by Type of Forage.*

Parameter to Measure	Uplands		Riparian Areas		
	General	Winter Range	Functioning	Functioning-At-Risk	Non-functioning
% Herbaceous Utilization	35-55%	25-35%	45%	35%	30%
% Browse Utilization	25-35%	10-20%	45%	40%	30%
Stubble Height on Hydric Greenline	N/A	N/A	4 inches	6 inches	6 inches
% Bank Disturbance	N/A	N/A	≤20%	≤20%	≤20%
% Ground Cover	N/A	N/A	N/A	N/A	N/A

Livestock suitability in Alternative 7R would be the same as for Alternative 7.

- *Table 2. 83 Range of Livestock Grazing Standards for Alternative 7R using most recent version of Caribou Riparian Grazing Implementation Guide.*

Type of Forage	Livestock Utilization Rates[1]
Upland Browse	25%-35%
Upland Herbaceous	35%-55%
Riparian Properly Functioning Condition – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-55% based on site-specific analysis 50% based on site-specific analysis 2-6 inches based on site-specific analysis
Riparian (At risk) – on greenline and/or the entire AIZ /2 **Herbaceous** **Browse** **Stubble Height**	20%-45% based on site-specific analysis 50% based on site-specific analysis 3-8 inches based on site-specific analysis
Riparian (Non-Functioning) – on greenline and/or the entire AIZ[2] **Herbaceous** **Browse** **Stubble Height**	20-40% based on site-specific analysis 40%-50% based on site-specific analysis 4-8 inches based on site-specific analysis
Percent Bank Disturbance (annual)	10%-25% based on site-specific analysis
Percent Soil Disturbance	5%-15% based on site-specific analysis

1 The use of any specific parameter, such as percent utilization, stubble height, or bank disturbance, depends on a site-specific analysis, except for both winter range utilization criteria. The procedure for this analysis is outlined in the Caribou Riparian Grazing Implementation Guide.

2 Aquatic Influence Zone (AIZ).

Mining Operations, Reclamation, and Hazardous Substance Management

Under Alternative 7R, an adaptive approach to mining operations, reclamation, and hazardous substance management would require a greater use of native plants, on-site topsoil/subsoil management, and more stable, natural appearing landscapes in reclamation activities. Hazardous substance management would be adaptively applied using research and monitoring activities to develop and implement Best Management Practices. Releases of hazardous substances would be managed to prevent releases in excess of established state and federal standards. In this alternative, a buffer zone was added around the borders of Known Phosphate Lease Areas (KPLAs) and the entire area included in Prescription 8.2.1, Inactive Phosphate Leases. Within the buffered area, road density standards of the underlying prescription do not apply to allow for exploration roads.

Riparian/Wetland Areas, Water Quality, and Aquatic Habitat Management

Riparian areas and watersheds would be aggressively managed through detailed guidance to maintain water quality and aquatic ecosystems and to restore degraded conditions where they exist. The primary focus of management activities would be on achieving riparian properly functioning condition, watershed protection, and restoration. Restoration of fisheries would be emphasized in McCoy Creek and other locations.

Streams that are in properly functioning condition would be managed to maintain or improve that condition. Streams that are functioning but "at risk" of further degradation would have more stringent standards and guidelines applied. Streams considered not functioning would have the most prohibitive standards and guidelines applied. Additional standards and guidelines would be applied to streams identified by the State of Idaho as water quality limited or containing Threatened and Endangered Species. (See Livestock Grazing Table 2.38 for riparian utilization.)

The Grace Municipal Watershed was dropped from Prescription 2.1.3 since it is not a congressionally designated watershed. This alternative does include direction for cooperation with the State and municipalities to establish and manage for Source Water Protection Areas (SWPAs).

TIMBER SALE PROGRAM

Vegetation management and silvicultural methods would focus on sawtimber and wood fiber, particularly on aspen/conifer, and aspen sites, as a by-product of vegetation treatments designed to meet desired future conditions. Forested vegetation management would be allowed on some forested lands classified as "unsuitable" but capable of sustaining timber production, to achieve ecological objectives.

- *Table 2. 84 Probable Timber Program Emphasis in Alternative 7R.*

Alternative 7R	Measurement
Suitable acres	82,900 acres
Types of vegetation emphasized in treatments	Aspen/conifer, aspen
Suitable forested acres harvested in the 1st decade	6,100 acres
Unsuitable forested acres harvested in the 1st decade	5,000 acres
Estimated Allowable Sale Quantity per decade	29 mmbf
Fuelwood harvest per decade	17 thousand cords
Miles of road needed for harvest activities per decade	35 miles
Silvicultural methods allowed	All methods
Use of even-age management	High
Regeneration	2,800 acres (conifer only)
Pre-commercial thinning	3,600 acres

RECOMMENDED WILDERNESS AND ROADLESS AREA MANAGEMENT

Under Alternative 7R, approximately 42,500 acres would be recommended for Wilderness in the Mt. Naomi and Caribou City Roadless Areas. The boundaries of these areas were changed to omit existing, open motorized routes; this correction resulted in a reduction of acres recommended from Alternative 7. Summer motorized travel would not be allowed in areas recommended for Wilderness but winter motorized travel would be allowed. The portion of the Worm Creek Roadless Area (~16,000 acres) recommended for Wilderness in 1985 would not be recommended in this Alternative. The Worm Creek Roadless Area would be managed as a semi-primitive motorized area (Management Prescription 3.2).

In response to legal issues and public comment, the Forest re-evaluated each individual Inventoried Roadless Area (IRA). A detailed description of this process and the results is included

as Appendix R. Instead of applying a blanket approach to IRA management, Alternative 7R reflects more specific management strategies. For instance, timber harvest and road building are allowed in approximately 12 percent of the inventoried roadless acres on the Forest.

Also in response to public comment, three areas within IRA's would be closed year-round to motorized travel to retain their primitive and semi-primitive non-motorized characteristics. A portion of land adjacent to Pebble Creek Ski Area will also provide non-motorized recreation opportunities in the winter. Several other areas will be managed for semi-primitive non-motorized experiences in the summer only. Some critical big game winter range will limit winter motorized access in IRA's as well.

WILDLIFE HABITAT MANAGEMENT

Wildlife habitat management would restore habitat quality for species-at-risk, including Threatened, Endangered, Proposed, and Sensitive Species. Habitat for hunted species, such as big game and upland birds, would be managed to maintain or restore habitat quality. Management actions could include vegetation treatments in habitats-at-risk, establishment of upland and riparian livestock forage utilization levels, and establishment of road/motorized trail densities. Big game winter range would be emphasized in selected areas through livestock forage utilization and access management, where it is identified.

A minimum of twenty percent of the forested acres in each 5th code HUC[6] would be maintained in late seral/old growth conditions. Fifteen percent of the forested acres in each HUC would be managed as old growth or for old growth recruitment where sufficient old growth currently does not exist. These acres would be maintained in larger blocks where feasible. Sagebrush stands would be managed in blocks of greater than 250 acres, where possible. Sagebrush treatments would be prioritized in the greater than 25 percent canopy cover class.

A high emphasis would be placed on maintaining or improving stronghold habitats for wildlife and fish addressed in specific recovery plans. Moderate emphasis would be placed on retaining and improving wildlife corridors. Several areas will be managed for security by not allowing motorized access in winter, summer, or year-round.

[6] A level of Hydrologic Unit Code (HUC) mapping hierarchy developed by the U.S. Geologic Service and used for the Interior Columbia Basin Ecosystem Management Project (ICEBMP) to map geographic boundaries of watersheds at various scales.

Alternative 7R

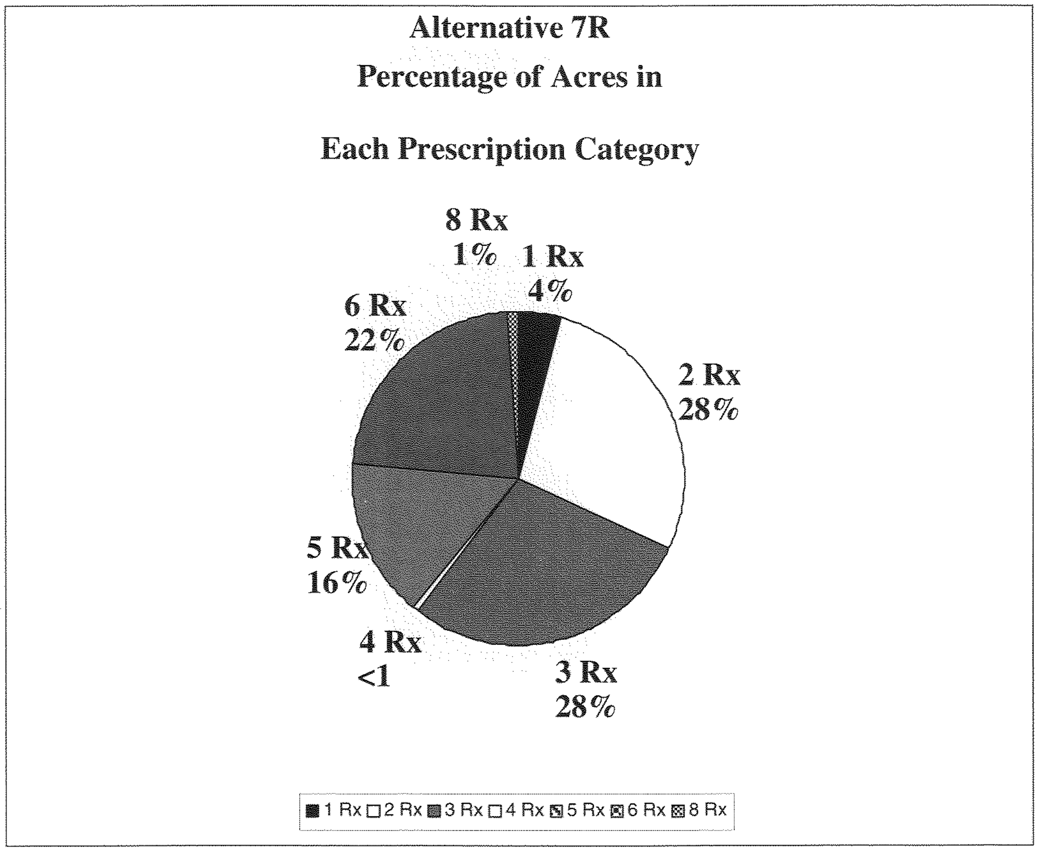
- *Table 2. 85 Prescription Acres in Alternative 7R.*

Prescription Category	Prescription Name	RX No./Access	Acres in Prescription
Wilderness /Backcountry	Summer non-motor; winter motor	1.3(b)	42,500
Special Management Areas	Bloomington Lake SEA	2.1.1(e)	200
	Visual Quality Maintenance	2.1.2(b)	10,100
	Pocatello municipal watershed	2.1.3(b)	5,100
	Caribou Mountain SEA	2.1.4(b)	20,400
	Lander Trail Corridor SEA	2.1.5(b)	2,900
	Gravel Creek SEA	2.1.6(b)	157
	Research Natural Areas	2.2	5,700
	Wild and Scenic Eligible River	2.5	2,800
	Winter range (critical)	2.7.1(d)	73,900
	Winter range	2.7.2(d)	109,800
	Aquatic Influence Zone	2.8.3	58,200
Semi-primitive non-intensive (Category 3)	Wildlife security: year-round non-motorized,	3.1(a)	24,850
	Summer non-motor; winter x-c motor	3.1(e)	16,350
	Year-round motor (designated summer)	3.2(b)	173,100
	Summer non-motor; winter x-c motor	3.2(e)	3,900
	Summer motor on designated routes; winter non-motor	3.2(f)	4,800
	Restoration: year-round motor (designated summer)	3.3(b)	73,800
Developed/Dispersed Recreation	Special Use Permit recreation sites access	4.2(d)	1,100
	Dispersed camping access	4.3(b)	3,900
Forested Vegetation Management	Year-round motor (designated summer)	5.2(b)	133,500
	Cross-country; year-round motor	5.2(c)	29,400
	Summer motor on designated routes; winter non-motor	5.2(f)	1,000
Rangeland Vegetation Management	Summer motor on designated routes; winter non-motor	6.2(b)	219,200
	Summer non-motor; winter x-c motor	6.2(e)	15,200
Concentrated Development Area	Utility corridors, commercial and admin sites	8.1	100
	Existing leases, undeveloped	8.2.1	2,400
	Active and reclaimed mines	8.2.2	8,000
Total			***1,042,357***

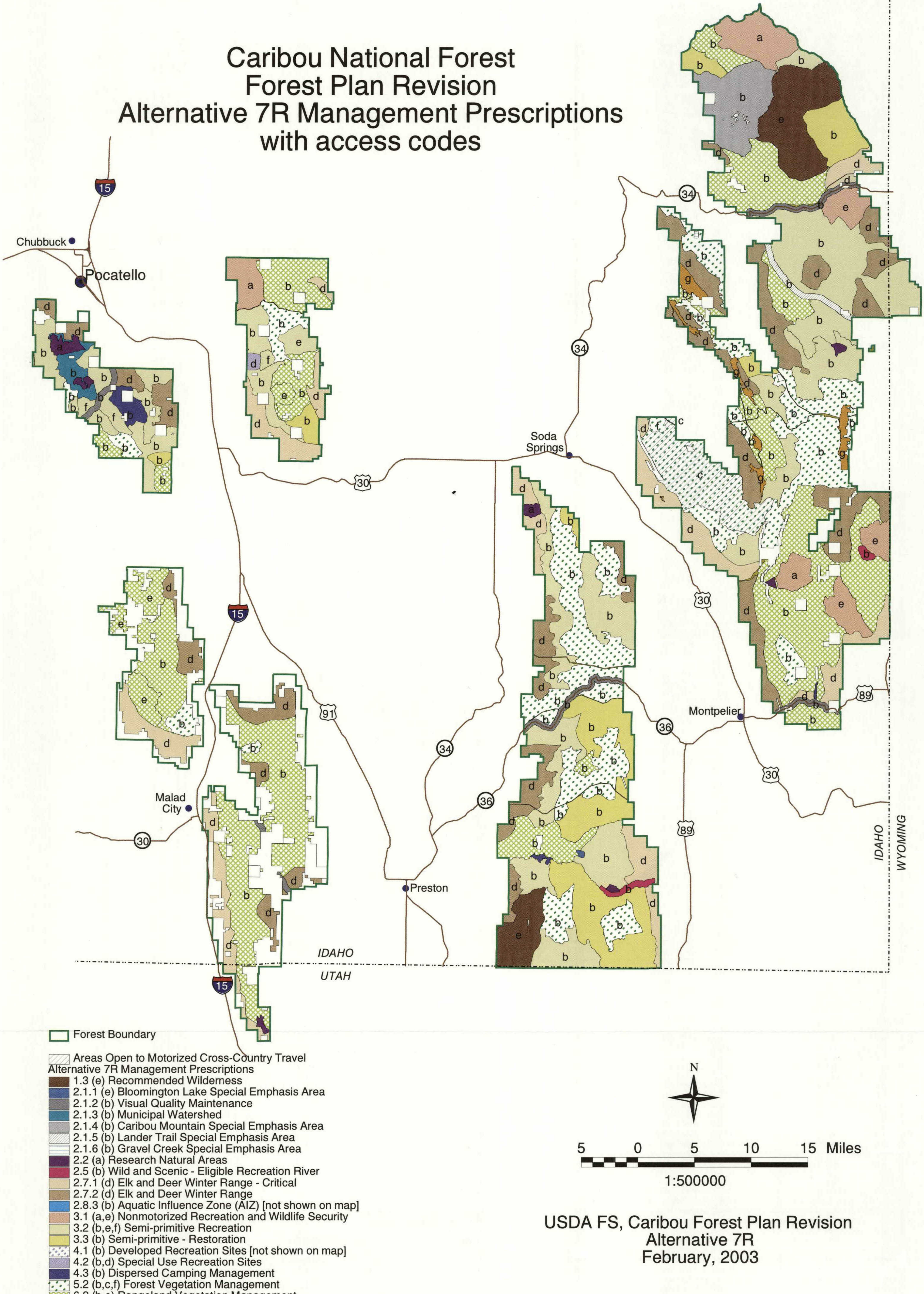
Table 2. 86 Probable Treatments in Alternative 7R.

Probable Treatments in the First Decade	Alternative 7R
Suitable Forested Acres Harvested	6,100
Unsuitable Forested Acres Harvested	5,000
Forested Acres Treated with Fire	20,000
Subtotal of Forested Acres Treated	31,100
Non-Forested Acres Treated with Fire	40,000
Total Acres Treated In Decade	71,100
Forested Acres Expected to Burn with Escaped Fire	15,000
Non-forested Acres Expected to Burn with Escaped Fire	3,000

- *Figure 2. 8 Percentage of Acres in each Prescription Category in Alternative 7R.*



Caribou National Forest
Forest Plan Revision
Alternative 7R Management Prescriptions
with access codes

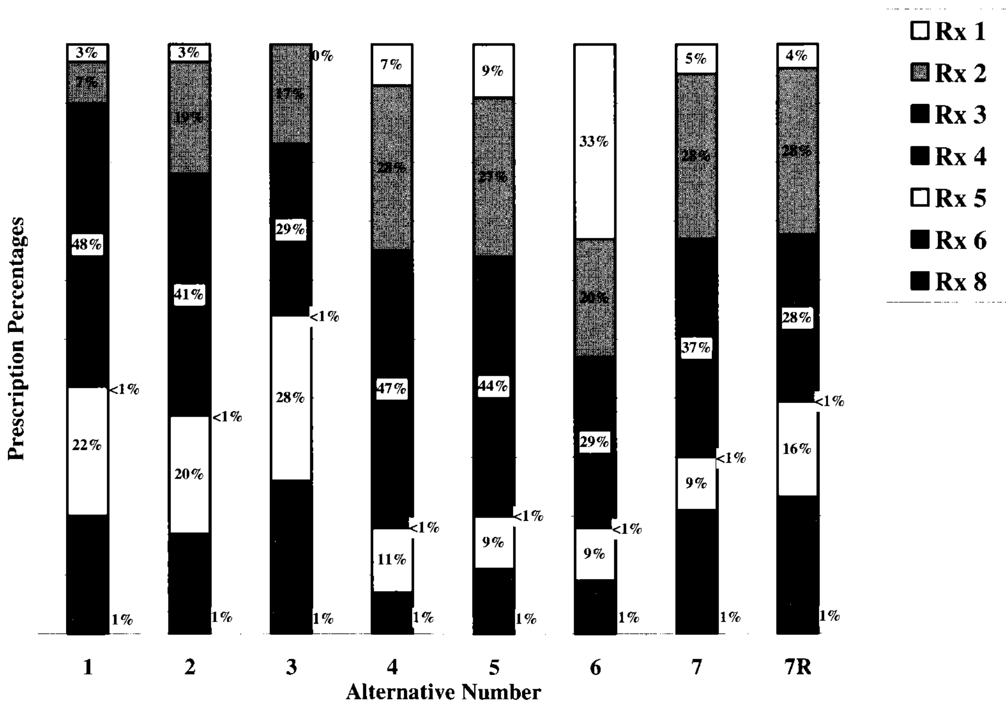


MAP 2.8

- *Table 2. 87 Summary of Percentage of Acres in Each Prescription Category By Alternative*

Prescription Category	Alternative							
	1	2	3	4	5	6	7	7R
Rx 1	3%	3%	0%	7%	9%	33%	5%	4%
Rx 2	7%	19%	17%	28%	27%	20%	28%	28%
Rx 3	48%	41%	29%	47%	44%	29%	37%	28%
Rx 4	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Rx 5	22%	20%	28%	11%	9%	9%	9%	16%
Rx 6	19%	16%	25%	6%	10%	8%	20%	22%
Rx 8	1%	1%	1%	1%	1%	1%	1%	1%

- *Figure 2. 9 Percent of Acres in Each Prescription Category by alternative.*



- *Table 2. 88 Summary of Estimated Probable Decadal Treatments by Alternative (Shown in acres treated in the first decade)*

Treatment	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt 7R[7]
Suitable Forested Acres Harvested	15,700	14,300	19,000	6,600	6,100	4,900	6,800	6,100
Unsuitable Forested Acres Harvested	1,100	2,400	2,900	500	400	0	500	5,000
Forested Acres Treated with Lethal Fire or Mechanically Felled[1]	None	17,400	19,900	49,900	19,200	20,800	26,800	20,000
Subtotal of Forested Acres Treated	16,800	34,100	41,800	57,000	25,700	25,700	34,100	31,100
Non-Forested Acres Treated with Lethal Fire[1]	130,000	77,500	100,000	77,500	70,800	60,000	79,700	40,000[2]
Total Acres Treated In Decade	***146,800***	***111,600***	***141,800***	***133,600***	***96,500***	***85,700***	***113,850***	***71,100[3]***

1 A component of these acres is likely to be non-lethal.
2 In Alternative 7R, other methods would be allowed and expected.
3 In Alternative 7R, an additional 19,000 acres are predicted to burn in wildland fires within the next decade.

[7] In Alternative 7R, acres expected to burn from escaped wildfire are not classified as "treatments". They are predicted to total 15,000 acres of forested lands and 3,000 acres of non-forested vegetation.

- *Table 2. 89 Comparison of Alternatives – Management Direction Components*

Issue 1: Recreation, Access and Scenery Management

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Access								
Open motorized road and trail density: In all alternatives, route densities would vary based on individual Rx direction. Shown here as the overall change from current levels.	No net gain	No net gain	Increase	Decrease	No net gain	Decrease	Slight Decrease	Slight Decrease
Summer cross-country motorized use: Shown as total acres open and (percent of Forest)	420,215 acres (40%)	420,215 acres (40%)	420,215 acres (40%)	0 acres	25,500 acres (3%)	0 acres	35,336 acres (3%)	22,900 acres (3%)
Winter travel: All alternatives have wildlife emphasis areas (generally winter range) requiring travel on designated routes. Differences are shown as 1) names of areas managed as non-motorized (nm) and 2) change in the amount of Forest where winter travel is limited to designated routes.	Mt. Naomi (nm) No change	Mt. Naomi (nm) No change	None nm No change	Mt. Naomi (nm) Increase	Mt. Naomi, Back Pebble Cr Ski Area (nm) Increase	Mt. Naomi, Back Pebble Cr Ski Area, Upper Bailey Creek (nm) High Increase	Back Pebble Cr Ski Area, some critical winter range (nm) Moderate Increase	Back Pebble Cr Ski Area, Toponce, Schmid Peak, Upper Bear Cr (nm) Moderate Increase
Recreation								
Recreation Opportunities: Shown as change over current levels of 1) Developed and 2) Dispersed opportunities.	No change for both types	No change for both mitigation for riparian	Increase for both, facilitated by private sector	No change for both mitigation for riparian	Increase for both, facilitated by private sector	No change Decrease in motorized ROS	Increase for both, facilitated by private sector	Increase for both, facilitated by private sector

Issue 3: Ecosystem Management

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Ecosystem Disturbances								
Insect and Diseases	Endemic and Epidemic-- Suppressed	Endemic—Natural Role Epidemic-- Suppressed	Endemic and Epidemic-- Suppressed	Endemic—Natural Role Epidemic-- Suppressed	Endemic—Natural Role Epidemic-- Suppressed	Endemic—Natural Role Epidemic—Protect Life/Property	Endemic—Natural Role Epidemic-- Suppressed	Endemic—Natural Role Epidemic-- Suppressed
Fire Management: All alternatives allow wildfire suppression and treatment of fuels by Rx fire in the wildland urban interface (WUI)	Allows Rx fire; No Wildland Fire Use (WFU)	Allows Rx fire, WFU	Allows Rx fire in rangeland, limited in timber; Allows WFU	Allows Rx fire inside rW, outside by mgt. Rx; Allows WFU	Allows Rx fire, WFU	Allows Rx fire, WFU	Allows Rx fire inside rW, outside by mgt. Rx; Allows WFU	Allows Rx fire inside rW, outside by mgt. Rx; Allows WFU
Forest Vegetation Diversity								
Conifer Goals: DRFC expressed as 1) the percent of acres in mature and old age classes and 2) the desired rate to reach that DRFC. All alternatives allow a variety of treatment methods.	N/a	30-40% in mature/old 100 years to attain	20% in mature/old 50-100 years to attain	30-40% in mature/old 100 years to attain	30-50% in mature/old 100 years to attain	Inside rW—no goal Outside rW—50% in mature/old 100 years to attain	30-40% in mature/old 100 years to attain	30-40% in mature/old 100+ years to attain
Aspen Goals: DRFC expressed as 1) the increase in acres of aspen and 2) the desired rate to reach that DRFC. All alternatives allow a variety of treatment methods, except as noted.	Low N/a	Medium 100 years to attain	High 50-100 years to attain	Medium 100 years to attain	Med. to Low 100 years to attain	Med. to Low 100 years to attain Only wildfire allowed in rW	Medium 100 years to attain	Medium 100+ years to attain

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Non-forested Vegetation Diversity								
Sagebrush Goals: DRFC expressed as 1) the percent of acres in the >15% canopy cover class and 2) the desired rate to reach that DRFC. All alternatives allow a variety of treatment methods, except as noted.	N/a Wildland Fire Use (WFU) is not allowed	30-50% in >15% cc 75 years to attain	30-50% in >15% cc 50-75 years to attain	30-50% in >15% cc 50-75 years to attain	30-50% in >15% cc 100 years to attain	Inside rW—no treat Outside rW--50% >15% cc 100 years to attain Only wildfire allowed in rW	30-50% in >15% cc 50-75 years to attain	30-50% in >15% cc 75 years to attain
Tall Forb Goals: All alternatives would retain and restore sites where they exist and manage others for watershed stability, except as noted. Treatment methods would be as directed by research. DFC expressed as the time to restore.	Management would be site specific, no direction. No DFC	100 years to attain DFC	Management would be site specific, no direction. No DFC	100 years to attain DFC	100 years to attain DFC	100 years to attain DFC	100 years to attain DFC	100 years to attain DFC

Issue 4: Livestock grazing

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Livestock Grazing Standards								
Upland Utilization Standards: Shown as percent of 1) browse use (b) and 2) herbaceous use (h)	35-45% b 50-60% h	35-45% b 45% h	25-35% b 35-55% h	25-35% b 35-55% h	25-35% b 35-55% h	25-35% b 35-55% h	25-35% b 35-55% h	25-35% b 35-55% h
Upland Winter Range Utilization Standards: Shown as percent of 1) browse use (b) and 2) herbaceous use (h)	10% b 30% h	10% b 30% h	25% b 35% h	10-20% b 35-45% h	10-20% b 35-45% h	10-20% b 35-45% h	10-20% b 35-45% h	10-20% b 35-45% h
Riparian Soil standards: Shown as percent of 1) bank disturbed and 2) overall soil disturbance	N/a N/a	N/a N/a	N/a 30% s	10-25% b 5-20% s	15% b N/a	10-25% b 5-20% s	10-25% b 5-20% s	10-25% b 5-15% s
Riparian Utilization Standards: The range reflects difference depending on condition of stream. Standards shown as 1) percent of browse use (b); 2) percent of herbaceous use (h); and 3) minimum stubble height remaining along the hydric greenline.	No Plan standards	N/a b 45% h 4-6 inches	30% b N/a h 3-4 inches	40-50% b 20-65% h 2-8 inches	No grazing to N/a b No grazing to 50% h No grazing or 6 inches	40-50% b N/a h 6 inches	40-50% b 20-65% h 2-8 inches	40-50% b 20-55% h 2-8 inches

Issue 5: Minerals Operation, Reclamation and Hazardous Substances Management

All alternatives, except for Alternative 6, use an adaptive approach to management. This approach would allow mine operation requirements to change based on new information and research. Current best management practices and other measures to minimize the risk of releasing hazardous substances would be used. Management could change based on new research and monitoring information. The prescriptive approach, used in Alternative 6, would take a conservative approach, incorporating current best management practices and other measures designed to eliminate any chance release of hazardous substances. Management direction changes would require an amendment to the Plan.

Issue 6: Riparian/Wetland Areas and Aquatic Habitat

The most substantial difference between alternatives is the livestock utilization levels described in Issue 4, above.

Issue 7: Timber Sale Program

Alternative **Management Direction**	**Alt 1** **No Action**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**	**Alt 7R** **Selected Alternative**
Timber Program								
Timberland Suitability: Shown as acres suitable	125,300	114,900	150,400	52,900	48,400	38,700	54,000	82,900
Silvicultural practices: All alternatives allow harvest on unsuitable lands and use of all harvest methods, except as noted. Differences shown as 1) expected use of even-aged management and 2) regeneration emphasis.	High use Plantation or natural	Moderate use Plantation or natural	High use Plantation or natural	Low use Emphasis on natural	Low use Plantation or natural	Low use Emphasis on natural	Moderate use Emphasis on natural	High use Emphasis on natural
Timber Sale Program: Shown as estimated timber offered as part of 1) Allowable Sale Quantity (ASQ) and 2) cords of firewood per decade.	60 MMBF 25 m cords	56 MMBF 22 m cords	67 MMBF 30 m cords	19 MMBF 10 m cords	20 MMBF 10 m cords	17 MMBF 8 m cords	22 MMBF 11 m cords	27 MMBF 17 m cords

Issue 8: Roadless Area Management and Recommended Wilderness

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Recommended Wilderness								
Total Acres Recommended	30,600	30,600	0	71,300	93,100	344,400	47,200	42,500
Areas Recommended: Names of IRA's or areas recommended for Wilderness designation.	Parts of: Mt. Naomi, Worm Creek	Parts of: Mt. Naomi, Worm Creek	N/a	All of: Mt. Naomi Parts of: Caribou City, Stump Peak	All of: Mt. Naomi Parts of: Caribou City, Worm Creek	All of: Mt. Naomi, Worm Creek, Stump Peak, Caribou City, Elkhorn Mtn, Gannett Spr, Red Mtn	Parts of: Mt. Naomi, Caribou City	Parts of: Mt. Naomi, Caribou City, excludes all motorized routes
Summer Access: Shown as recommended Wilderness managed for 1) non-motorized (nm) and 2) motorized on designated routes.	Mt. Naomi (nm) Worm Creek	Mt. Naomi (nm) Worm Creek	N/a N/a	Mt. Naomi Caribou City (nm) Stump Peak	Mt. Naomi Caribou City (nm) Worm Creek	All nm None	Mt. Naomi Caribou City (nm) None	Mt. Naomi Caribou City (nm) None
Winter Access: Shown as recommended Wilderness managed for 1) non-motorized (nm) and 2) motorized, as shown.	Mt. Naomi (nm) Worm Creek	Mt. Naomi (nm) Worm Creek	N/a N/a	Mt. Naomi (nm) Caribou City Stump Peak	Mt. Naomi (nm) Caribou City Worm Creek	Mt. Naomi (nm) All others on des. routes	None nm Mt. Naomi Caribou City	None nm Mt. Naomi Caribou City
Roadless Area Management								
Development Allowed: Shown as 1) road construction and 2) timber harvest allowed based on Rx or Roadless Area Conservation Initiative (RACI) direction.	Y Y	Y Y	Y Y	Y (RACI) Y (RACI)	Y (RACI) Y (RACI)	N Y (RACI)	Y (RACI) Y (RACI)	Y Y

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Summer Access: Shown as the change in acres managed as 1) non-motorized and 2) motorized, as noted, over current levels.	No change No change	No change No change	Decrease nm Increase m	No change No change, but on des. Routes'	Increase nm Decrease m	Increase nm Decrease, but on des. Routes	No change nm No change, but on des. Routes	Increase nm No change, but on des. routes

Issue 9: Wildlife Habitat Management

Alternative Management Direction	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 7R Selected Alternative
Wildlife Habitat Management								
Old forests: Shown as minimum percent of each 5th code HUC managed as 1) old growth and 2) mature/old age class vegetation.	10% N/a	15% 20%	10% 20%	15% 20%	15% 20%	20% 25%	15% 20%	15% 20%
Corridors: Shown as relative emphasis on protection of corridors and biological strongholds for terrestrial species.	None	Moderate	Low	Moderate	Moderate	High	Moderate	Moderate
Big game Winter Range: Shown as relative amount of acres in a winter range Rx.	None	Moderate	Low	Moderate	High	High	Moderate	Moderate
T, E, S Wildlife, Fish, and Plants: Shown as emphasis on identification and protection of strongholds and compliance w/ recovery plans.	Legal compliance	Moderate to High	Legal compliance	High	Moderate	High	High	High

Alternatives Considered but Eliminated from Detailed Study

A wide range of management scenarios or options that could be employed on the Caribou NF has been considered. Many of these management options were presented by the public during scoping or during public involvement efforts associated with the development of Alternatives and the "Build Your Own Alternative Exercise" of 1999.

These options or Alternatives were considered by the interdisciplinary team during content analysis following each round of public involvement but were eliminated from detailed analysis for the reasons described below.

Option: Make The Forest A Fish, Wildlife, And Plant Sanctuary Preserve Or Wilderness.

While each of the Alternatives manage some areas of land in a sanctuary or preserve-like fashion, such as recommended Wilderness or research natural areas, to manage the entire Forest as a sanctuary or preserve fails to address many of the Proposed Programmatic Actions in the Purpose and Need identified in Chapter 1 of this document. The Forest Service mission is a multiple use mission, well established in the agency's legal and regulatory framework, and Forest Plans provide guidance for those multiple uses and values. The Purpose and Need presents many revision topics to address those multiple uses and values. This Alternative fails because it does not meet the Purpose and Need nor does it address a number of Needs for Change topics, such as vegetation, recreation, or minerals.

Options: Open The Forest To All Uses, Everywhere, At All Times. No Travel Restrictions, Including No Restrictions On Motorized Use. Eliminate Off-Road And Snowmobile Use. Allow Only Foot And Horse Traffic.

Some Alternatives eliminate all off-road use and snowmobile use in some areas. Some areas of the Forest are open to all uses all of the time or without travel restriction in some Alternatives. However, to manage the entire Forest in either of the options above fails to meet the Purpose and Need as identified in Chapter 1 of this document (see Proposed Programmatic Actions – Recreation). Furthermore, the Forest Service mission is a multiple use mission, and Forest Plans provide guidance to those multiple uses and values, including both motorized and non-motorized recreation use. As stated above, the Alternatives provide a variety of combinations of motorized and non-motorized use consistent with the multiple use mission. To manage the forest for a single use fails to meet both the Purpose and Need and the multiple use mission of the Forest Service.

Option: Acquire All In-Holdings

This Alternative fails to meet the Purpose and Need for revision identified in Chapter 1 of this document (see Proposed Programmatic Actions). Land acquisition was not identified as a need for change nor has it been identified as a Purpose and Need for revision. Furthermore, by policy, the Forest Service has no authority to acquire lands from other owners unless the specific parcel is offered to the Forest Service by the owner of that parcel.

Options: No Livestock Grazing Forest-Wide.

No Timber Harvest Forest-Wide.

Some Alternatives eliminate gazing and timber harvest in some or even many areas. However, to manage the entire Forest in either of the options above fails to meet the Purpose and Need identified in Chapter 1 of this document (see Proposed Programmatic Actions – Vegetation and Livestock Grazing). Furthermore, the Forest Service mission is a multiple use mission, and Forest Plans provide guidance to those multiple uses and values including livestock grazing and timber harvest. As stated above, the Alternatives provide a variety of combinations of areas in which grazing or timber harvest is or is not allowed, consistent with the multiple use mission. All Alternatives analyzed in detail provide standards to permit grazing and timber harvest with appropriate environmental protection. To manage the entire Forest for either of these single uses fails to meet both the Purpose and Need and the multiple use mission of the Forest Service.

Options: Harvest Only Old or Diseased Trees Forest-Wide.

While all Alternatives provide for the harvest of dead and diseased trees, to harvest only old or diseased trees Forest-wide fails to meet the Purpose and Need for action described in Chapter 1of this document. Specifically, the Proposed Programmatic Actions under Vegetation in the Purpose and Need call for developing direction for the management of vegetation for ecological and multiple use purposes. The narrow focus of harvesting only dead and diseased trees Forest-wide fails to meet the much broader Purpose and Need for treatment of vegetation to achieve desired ecological conditions.

Comparison of Alternatives

This section identifies the environmentally and agency preferred Alternatives, as required by NEPA. It also includes the Summary of Effects by alternative.

Environmentally Preferred Alternative

Regulations implementing the National Environmental Policy Act (NEPA) require agencies to specify the alternative(s) considered to be environmentally preferable (40 CFR 1505.2(b)). Forest Service policy further defines this as the alternative that best meets the goals of section 101 of NEPA. This calls on Federal, State, and local governments and the public to create and maintain conditions under which humans and nature can exist in productive harmony. In determining the environmentally preferred alternative, the Forest refers to the goals of Section 101:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use, which will permit high standards of living and a wide sharing of life's amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternatives *6* and *7R—Selected Alternative* are the Environmentally Preferred Alternatives. Over the long term, Alternative 7R would cause "the least damage to the biological and physical environment" (CEQ 40 Most Asked Questions, #6A). Over the short term, Alternative 6 would cause the least damage due to the substantial reduction in timber harvest and livestock grazing levels.

- Alternative 7R is the best balance between maintaining ecosystem processes while considering the needs of mature timber and sagebrush obligates. The emphasis of this alternative is to restore aspen where it is seral to conifers. The forested and non-

forested vegetation treatments that will likely be proposed will help move the Forest more towards the historical range of variability, benefiting more wildlife species.

- While Alternative 6 would reduce timber harvest, motorized recreation, and livestock grazing, the lack of vegetation management would not be environmentally preferable over the long term. Both forested and non-forested vegetation would move further away from historical range of variability and become denser, resulting in a loss of diversity.
- Riparian conditions and fisheries habitat would improve the most with Alternative 6, especially over the short-term. Without long-term management of the upper watersheds, it is uncertain how long that would last.
- Alternative 7R provides more for the human element than does Alternative 6. The latter focuses on non-motorized recreation and passive use of the environment.

WHICH ALTERNATIVE MAXIMIZES THE PRESENT NET VALUE?

The NFMA requires the Forest to identify which alternative maximizes the Present Net Value (PNV) and how the selected alternative compares to this (36 CFR 219.12.j.2). According to the economic analysis in the Caribou Forest Plan Revision FEIS, Alternative 3 maximizes both financial and economic PNV. Alternative 3 has the highest PNV due to the higher level of timber harvest predicted. The economic PNV (public benefits minus costs) varies by only 4 percent between alternatives. The net value ranges from a low of $9,552 million for Alternative 6 to a high of $9,941 million for alternative 3. Alternative 7R has an economic PNV of $9,684 million. (FEIS, Chapter 4, Social and Economic Factors)

Agency Preferred Alternative

Alternative 7R is the Agency's Selected Alternative. In response to public comments on the Draft Environmental Impact Statement and Draft Forest Plan, Alternative 7R was developed to manage forested and non-forested resources to attain the "desired future condition." It features an emphasis on adaptive management and monitoring to resolve uncertainties regarding the management of Forest resources. This adaptive strategy offers an avenue to describe and evaluate the consequences of changing conditions and knowledge. Monitoring and additional analysis are used to shape future management actions within the framework of the Forest Plan.

This Alternative would allow a variety of vegetation management practices, focusing on restoration of key communities such as aspen. Timber harvest would be allowed in inventory roadless areas where appropriate. The alternative incorporates elements of other alternatives described in the Draft in order to address public comments. In order to implement the Plan, the Forest will likely propose vegetation management, road rehabilitation, prescribed fire, wildland fire use, and a myriad of other activities in the next decade. The amount of activity occurring is based on current staffing levels and planning requirements, not what is needed to meet the desired

future conditions. In this alternative, the desired outcome is not a number of acres treated; it is an ecological condition on the ground. This alternative emphasizes the issues of ecosystem management, riparian/wetland areas, minerals management, water quality, wildlife, and motorized/non-motorized access. A more diverse mix of recreation opportunity is fostered by this Alternative. Cross-country motorized access is significantly reduced (from forty percent to three percent of the Forest) without significant change to overall motorized access. Non-motorized recreation opportunity is increased. Wilderness recommendation of 42,500 acres would increase the current Plan's 30,600-acre recommendation.

Summary of Effects

- *Table 2. 90 Summary of Environmental Effects Using Issue Indicators*

Issue 1: Recreation, Access and Scenery Management

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 DEIS Preferred	Alt 7R Selected
A 1 % of acres in Recreation Opportunity Class (ROS):								
Primitive	1%	1%	1%	1%	1%	1%	1%	1%
Semi-primitive non-motorized	8%	8%	2%	8%	13%	36%	8%	8%
Semi-primitive motorized	53%	53%	59%	53%	48%	25%	53%	53%
Roaded natural	22%	22%	22%	22%	22%	22%	22%	22%
Rural	15%	15%	15%	15%	15%	15%	15%	15%
A 2 Acres open to cross-country motorized use during the snow-free season	420,215	420,215	419,539	0	25500	0	22900	29400
A 3 Motorized and non-motorized opportunities (expressed as acres of ROS categories)								
Acres open to over-the-snow motorized travel	1,013,300	1,001,000	1,015,800	971,200	962,700	957,100	981,200	1,011,385
Acres of snow-free non-motorized travel	103,500	103,500	31,800	95,500	150,500	389,200	91,500	233,000
Acres of over-the-snow non-motorized travel	28,900	41,200	26,400	71,000	79,500	85,100	61,000	30,700
Miles of snow-free motorized roads and trails	2,033	2,033	2,033	1,876	1,876	1,298	1,904	1,993

Issue 2: Social and Economic Environment

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 Preferred	Alt 7R Selected
EC 1 Changes in jobs (% annual change)	5%	5%	6%	2%	3%	-2%	3%	5%
EC 2 Changes in Income (%)	2%	2%	3%	0%	0.4%	-3%	1%	2%
EC3 PNV (Present Net Value) (Economic Efficiency)	$9,894	$9,894	$9,941	$9,613	$9,613	$9,552	$9,624	$9,684

Issue 3: Ecosystem Management

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 Preferred	Alt 7R Selected
Disturbances								
EM 1 Insect hazard rating—low, low/mod, mod, mod/high, high	High risk	High risk	High risk	High risk	High risk	High risk	High risk	High risk
EM 2 Wildfire hazard rating—low, low/mod, mod, mod/high, high for forested (F) and non-forested vegetation (NF)	(F) Mod-High (NF) Low	(F) Mod-High (NF) Low-Mod	(F) Mod-High (NF) Low	(F) Mod-High (NF) Low-Mod	(F) Mod-High (NF) Mod	(F) Mod-High (NF) Mod	(F)Mod- High (NF) Low-Mod	(F)Mod (NF) Mod-High
EM 3 Fire Condition Class (% of vegetation in condition class 3)	48%	61%	55%	63%	62%	67%	62%	71%
Forested Vegetation								
EM 4 Percent of conifer and aspen acres in mature and old condition class in Year 100, compared to DRFC	Conifer = 68% Aspen = 85%	Conifer = 64% Aspen = 82%	Conifer = 64% Aspen = 82%	Conifer = 59% Aspen = 53%	Conifer = 75% Aspen = 71%	Conifer = 76% Aspen = 84%	Conifer = 63% Aspen = 76%	Conifer = 67% Aspen = 55%
EM 5 Percent of conifer and aspen acres in mature and old condition class in Year 10, compared to DRFC	Conifer = 80% Aspen = 68%	Conifer = 80% Aspen = 73%	Conifer = 80% Aspen = 73%	Conifer = 78% Aspen = 72%	Conifer = 82% Aspen = 73%	Conifer = 83% Aspen = 74%	Conifer = 81% Aspen =76%	Conifer = 80% Aspen =64%
EM 6 Number of decades to reach DRFC	Not applicable	100 years	50-100 years	100 years	100 years	Inside rW = natural Outside rW= 100 years	100 years	100+ years
Non-Forested Vegetation								
EM 7 Percent of acres in >15 % canopy cover of sagebrush in Year 10 and long-term, compared to HRV	Y10 = 35% LT = 36%	Y10 = 48% LT = 62%	Y10 = 43% LT = 51%	Y10 = 48% LT = 62%	Y10 = 50% LT = 65%	Y10 = 53% LT = 70%	Y10 = 48% LT = 61%	Y10 = 58% LT = 89%
EM 8 Number of decades to reach HRV	~0.7 decades	6.0 decades	1.4 decades	6.0 decades	>10.0 decades	Not applicable	4.5 decades	>10.0 decades

Issue 4: Livestock grazing

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 Preferred	Alt 7R Selected
LG 1 Estimated number of suitable acres for cattle and sheep	C = 460,303 S = 701,942	C = 460,303 S = 701,942	C = 460,303 S = 701,942	C = 407,942 S = 630,160	C = 401,051 S = 621,256	C = 255,269 S = 403,149	C = 452,621 S = 694,066	C = 452,251 S = 693,115
LG 2 Potential forage production on suitable range acres expressed in Animal Months	C = 213,632 S = 1,640,639	C = 174,790 S = 1,342,340	C = 174,790 S = 1,342,340	C = 152,965 S = 1,219,429	C = 150,463 S = 1,190,347	C = 97,369 S = 734,832	C = 171,533 S = 1,339,256	C = 171,671 S = 1,340,916
LG 3 Change in actual use based on current management	C= -7% S= -7%	C= -7% S= -5%	C= -6% S= -6%	C= -24 to -31% S= -7%	C= -30 to -38% S= -7%	C= --65 to -66% S= -59%	C= -19 to -26% S= -5%	C= -17 to -24% S= -4%
LG 4 Upland vegetation response to livestock grazing expressed as trend (↓, →, ↑)	→, ↑ slowest rate of improvement	→, ↑	→, ↑	→, ↑	→, ↑	→, ↑ fastest rate of improvement	→, ↑	→, ↑

Issue 5: Minerals Operation, Reclamation and Hazardous Substances Management

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 Preferred	Alt 7R Selected
Management direction is prescriptive or adaptive	Adaptive	Adaptive	Adaptive	Adaptive	Adaptive	Prescriptive	Adaptive	Adaptive

Issue 6: Riparian/Wetland Areas and Aquatic Biota

Key Indicators for Significant Issues	**Alt 1** No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	**Alt 7** Preferred	**Alt 7R** Selected
R 1 Relative potential to protect and improve watershed integrity as defined in IWWI and measured by percent of watersheds disturbed	Lower potential	Lower potential	Lowest potential	Moderate potential	Higher potential	Highest potential	Moderate potential	Moderate potential
R 2 Riparian condition measured as relative protection by alternative	Lower potential	Lower potential	Lowest potential	Moderate potential	Higher potential	Highest potential	Moderate potential	Moderate potential
R 3 Water quality measured as relative protection by alternative	Lower potential	Lower potential	Lowest potential	Moderate potential	Higher potential	Highest potential	Moderate potential	Moderate potential
R 4 Fish population viability, based on probability of persistence over the long-term.	Low persistence of species	Low persistence of species	Low persistence of species	High persistence of species	High persistence of species	High persistence of species	Moderate persistence of species	Moderate persistence of species

Issue 7: Timber Sale Program

Key Indicators for Significant Issues	**Alt 1** **No Action**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7** **Preferred**	**Alt 7R** **Selected**
T 1 Allowable Sale Quantity 1st decade	60 mmbf	56 mmbf	67 mmbf	20 mmbf	20 mmbf	17 mmbf	22 mmbf	27 mmbf
T 2 Total Sale Program Quantity (ASQ+other wood products in 1st decade)	83 mmbf	78 mmbf	92 mmbf	26 mmbf	26 mmbf	23 mmbf	28 mmbf	51 mmbf
T 3 Acres harvested (Decade total)	16,800	16,700	21,900	7,100	6,500	4,950	6,800	6,100
T 4 Suitable Acres	125,300	114,900	150,400	52,900	48,400	38,700	54,000	84,000
T 5 Acres of suitable timber in Roadless Areas	62,900	58,900	84,100	0	0	0	0	30,700
T 6 Estimated total miles of road construction (C) reconstruction (RC)	C = 56 RC = 25	C = 55 RC = 18	C = 73 RC = 25	C = 8 RC = 9	C = 7 RC = 9	C = 3 RC = 4	C = 9 RC = 9	C = 22 RC = 13

Issue 8: Roadless Area Management and Recommended Wilderness

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt. 7 Preferred	Alt 7R Selected
RA 1 Percent of acres in management prescription categories 1, 2, and 3	58%	63%	46%	82%	80%	82%	70%	70%
RA 2 Projected acres harvested in Inventoried Roadless Areas	11,700	11,700	15,300	500	400	50	500	1,525
WD 1 Acres recommended to Congress for the Wilderness Preservation System	30,600	30,600	0	71,600	95,100	341,900	47,200	42,500
WD 2 and WD 3 Non-motorized and motorized opportunity within recommended wilderness **SNM – Summer non-motorized** **SM = Summer motorized** **WNM = Winter non-motorized** **WM = Winter motorized**	SNM = 14,600 SM =16,000 WNM = 14,600 WM = 16,000	SNM = 14,600 SM = 16,000 WNM = 14,600 WM = 16,000	N/A N/A N/A N/A	SNM = 14,600 SM = 57,000 WNM = 14,600 WM = 57,000	SNM = 79,100 SM = 16,000 WNM = 14,600 WM = 80,500	SNM = 341,900 SM = 0 WNM = 14,600 WM = 327,300	SNM = 47,200 SM = 0 WNM = 0 WM = 47,200	SNM = 42,500 SM = 0 WNM = 0 WM = 42,500

Issue 9: Wildlife Habitat Management

Key Indicators for Significant Issues	Alt 1 No Action	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7 Preferred	Alt 7R Selected
WL 1 Viability analysis based on wildlife habitat outcomes where "low risk" means a high likelihood of persistence and where "moderate risk" means moderate likelihood of persistence								
• Risk to forested vegetation associated species	Moderate risk	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk	Low risk
• Risk to rangeland vegetation associated species	Low risk	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Low risk	Low risk
• Risk to riparian vegetation associated species	Moderate risk	Moderate risk	Moderate risk	Low risk	Low risk	Low risk	Low risk	Low risk
WL 2 Determine how habitats contribute toward state game population management goals and objectives (Meets, Does not meet)								
•Summer Habitat Effectiveness	Does not meet	Does not meet	Does not meet	Meets	Meets	Meets	Meets	Meets
•Hunting Season Vulnerability	Does not meet	Does not meet	Does not meet	Meets	Meets	Meets	Meets	Meets
•Acres managed for Winter Range	Does not meet	Meets	Does not meet	Meets	Meets	Does not meet	Meets	Meets
Other Resources								
T, E, and S Plant Viability Risk	Moderate	Low-Moderate	Moderate (-)	Low	Low	Low (+)	Low	Low

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Final Environmental Impact Statement

Caribou Revised Forest Plan
Chapter Three—Affected Environment

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Chapter 3 Affected Environment

The purpose of Chapter 3 is to describe the physical, biological, and social environments of the Caribou National Forest. Chapter 3 frames this understanding by reviewing the existing Forest environment that could be affected from implementing any of the management Alternatives described in Chapter 2.

The discussion in this chapter is arranged by public issues brought forward during the public scoping process. After a general discussion of the forest setting, the chapter chronologically follows the issue statements identified in Chapter 1. Other information regarding the affected environment on general resources is found at the end of the chapter.

Chapter 3 sets the framework for understanding the existing physical, biological, and human uses of the Forest. For more information, consult the individual specialist reports available for review at the Forest Supervisor's Office in Idaho Falls, Idaho.

General Setting and Forest Physiography

SOILS AND GEOLOGY

Scale: Subsection

Soils and geology are an initial stratification in ecological grouping. They influence vegetation, watershed condition, and land uses. Soils and geology have been used to determine the effects that timber harvest, livestock grazing, recreation, prescribed fire, and other management activities may have on watersheds.

Because of the wide range of geologic and soil characteristics found on the Caribou National Forest (CNF), only relatively broad generalizations can be made here to provide an overview. Subsections are used to display this broad generalization. Subsections are land areas having similar surface geology, lithology, geomorphic process, soil groups, sub regional climate, and potential natural communities. The methodology and process for mapping and describing subsections on the Forest is documented in "A Hierarchical Stratification of Ecosystems on the Caribou National Forest" (USDA-FS, 1997). A more detailed Soil Survey (USDA-FS, 1990) has been completed for the Forest to provide a basis for planning and project level analysis.

Information from broad-scale assessments, such as the Interior Columbia River Basin Assessment, has been used to help set the context for mid-scale Forest planning. The information and direction for forest resources has been further broken down into fine-scale assessments and information. Again, this varies by issue and resource. In determining the appropriate scale(s) to be used in the forest planning efforts, Forest specialists considered the best methods for classifying and analyzing ecosystems. Some resources and management considerations, such as capability, forest health, fragmentation and terrestrial species, are best

analyzed within the context of terrestrial units. On the other hand, resources and management considerations, such as water quantity and quality, fish and aquatic species habitat, can best be analyzed within the context of aquatic units.

ECOLOGICAL HIERARCHY OF TERRESTRIAL UNITS

The ecosystems of the Forest have been stratified into progressively smaller areas of increasingly uniform ecological potentials following the National Hierarchical Framework of Ecological Units adopted by the Forest Service in 1993. The stratification system uses nine levels. The first two levels, called Domains and Divisions, are based on climate. The third level, called Provinces, is based on broad vegetation zones. The fourth and fifth levels, Section and Subsection, are based on geomorphic processes and physiographic characteristics. The last two levels are landtype associations and landtypes. These levels are based on groups of similar soil and vegetation types. Generally, Landtype Associations are the lowest level for meaningful Forest Plan analyses.

The Caribou National Forest lies completely within the Dry Domain, Temperate Steppe Regime Mountains Division, Southern Rocky Mountain Steppe - Open Woodland – Coniferous Forest – Alpine Meadow Province, and the Overthrust Mountains Section. For this planning effort, the Forest has been delineated into seven different subsections. Characteristics of the subsections are summarized in Table 3.1 and explained in more detail in the pages beyond. Where appropriate, effects have been analyzed at the subsection scale. In addition, subsections are used in the Plan to drive management emphasis and prioritization.

For more detailed information, see Ecological Subregions of the United States: Section Descriptions (1994), Ecosystem Stratification of the Caribou National Forest (1996), Properly Functioning Condition Rapid Assessment Process, 1996 Intermountain Region Draft, and Draft Caribou National Forest and Surrounding Area Subregional Assessment for Properly Functioning Condition, 1997 and the Initial Analysis of the Management Situation, 1999.

Table 3. 1. Subsection Characterization for Caribou National Forest.

Descriptor	Basin and Range Transitional Mountains (M331Du)	Portneuf Uplands (M331Db)	Cache Valley Front (M331Dc)	Bear River Karst Highlands (M331Dd)	Preuss Ridges and Hills (M331Df)	Webster Ridges and Valleys (M331Dg)	Caribou Range Overthrust Mountains (M331Di)
Landscape Setting	Bannock Range, Elkhorn, Malad, and Oxford Mtns	Portneuf Range	West side of Bear River Range	East side of Bear River Range	Preuss Range, Gannet Hills, west side of Aspen Range	Schmid, Dry and Freeman Ridges, Webster and Grays Ranges	Caribou, Black and Bald Mtns, Little Elk Mtns
Main Drainage(s)	Bear River, Portneuf River	Portneuf River	Bear River	Bear River	Salt River, Thomas Fork	Salt River, Blackfoot River	Salt River
Dominant Lithology	Marine sediments, metamorphosed, minor volcanic rocks	Marine quartzite, limestone, dolomite. Some metamorphism. Recent tuff and ash influence.	Marine shale, siltstone, mudstone, quartzite. Some limestone.	Marine dolomites, limestone, and sandstone. Unconsolidated surface glacial deposits.	Marine & non-marine siltstone, sandstone and shale.	Marine limestone, shale, siltstone and sandstone.	Freshwater limestone, shale, siltstone and sandstone.
Geomorphic Influences	Volcanics are locally unstable and erodible.	Localized loess deposits and past mass wasting.[1]	Past glaciation[2]	Water dissolution[3] in limestone. Past glaciation.	Past localized mass wasting.	Past localized mass wasting.	Past localized mass wasting and glaciation.
Elevation Range	5,000 ft. to 9,000 ft.	4,500 ft. to 9,300 ft.	5,000 ft to 9,300 ft.	5,900 ft to 9,700 ft.	6,000 ft to 10,000 ft.	6,400 ft. to 10,000 ft.	5,600 ft. to 9,800 ft.
Mean Annual Precipitation	18-30 in.	18-35 in.	12-40 in.	12-40 in.	22-30 in.	24-40 in.	28-40 in.
Precipitation Timing	Most in winter and spring as snow	Most in winter; 50% as snow	Most in spring and summer; 60% as rain	Most in fall and winter as snow	Most in winter and spring as snow	Most in winter and spring; 55% as snow	Most in winter and spring; 60% as snow
Major Differences from Other Subsections	Basin and Range topography	Basin and Range topography	Localized karst[4] topography. Faulting. Past localized glaciation.	Localized karst topography. Past localized glaciation.	Locally unstable mountain slopes.	Phosphoria deposits.	Landslides. Past localized glaciation.
Degree of Stream Dissection/and Pattern	Moderate Dendritic[5] and Parallel[6]	Moderate Highly/Dendritic	Moderate Highly/ Dendritic	Slightly Moderate/ Dendritic and Parallel	Moderate Highly/ Dendritic and Parallel	Moderate Trellis/ Dendritic and Parallel	Slightly-Moderate/ Dendritic and Parallel
Erosion Hazard	Moderate to High	Moderate to High	Moderate to High	Moderate to High	Moderate to High	Moderate to High	Moderate to High
Productivity Potential	Low to High	Low to Moderate	Low to High	Low to High	Low to High	Low to High	Low to High

1 **Mass wasting**—the process of gravity controlled movements of earth materials

2 **Glaciation**—the process of erosion, shaping, and molding of landscapes by glacial ice

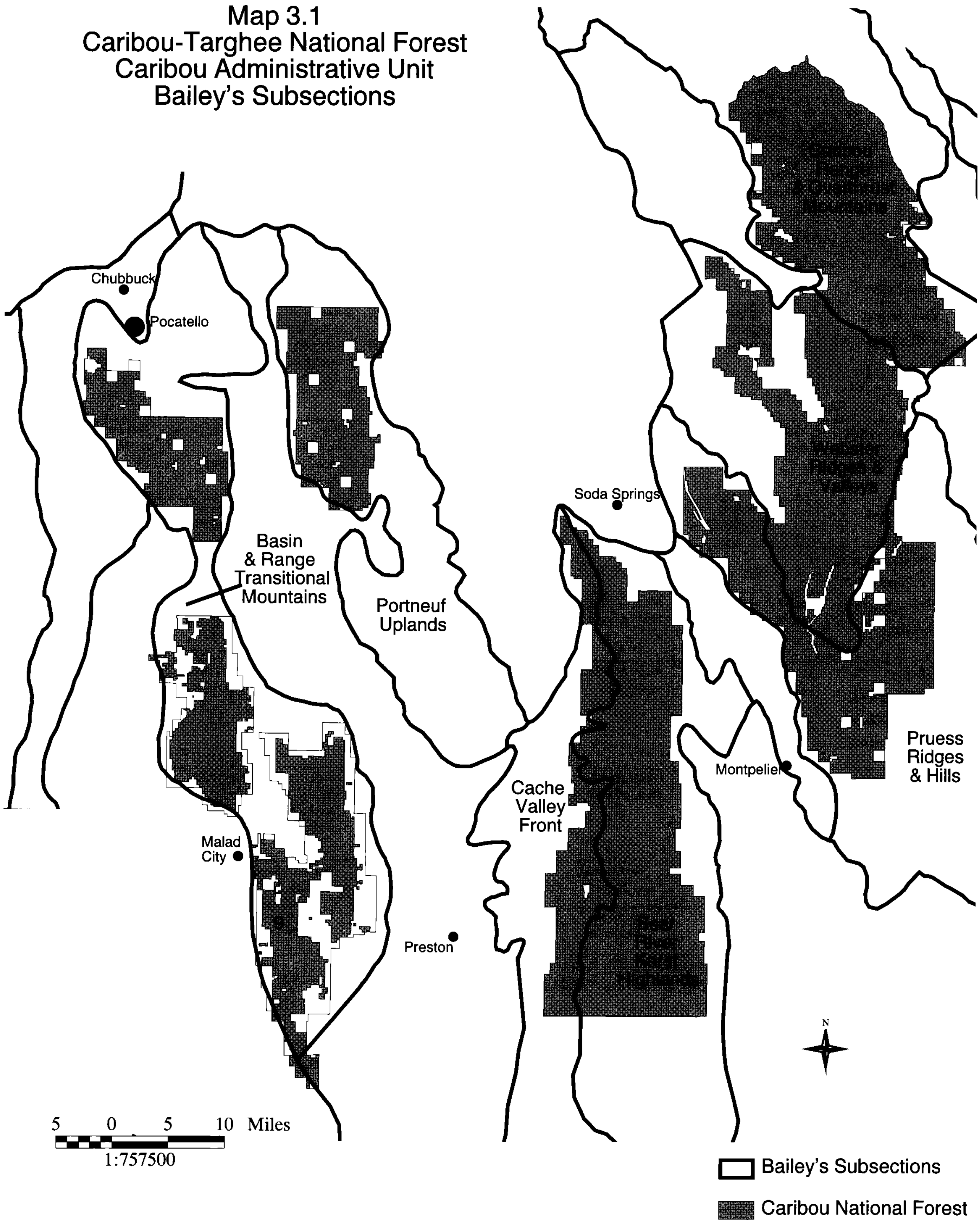
3 **Dissolution**—the process of dissolving

4 **Karst**—topography with sinkholes, caves, and underground drainage formed in limestone by dissolution

5 **Dendritic**—a drainage pattern in which the streams branch randomly in all directions and at almost any angle, resembling the branching habit of a tree

6 **Parallel**—a drainage pattern in which the streams and their tributaries are regularly spaced and flow parallel or sub parallel to one another over a considerable area

Map 3.1
Caribou-Targhee National Forest
Caribou Administrative Unit
Bailey's Subsections



SUBSECTION DESCRIPTIONS

Based on the national ecological unit mapping effort (ECOMAP, 1994), the Forest is wholly or partially contained within seven large-scale ecological units called subsections. Using this scale of mapping, resource conditions and characterizations can be assessed at a broader level that is more appropriate for forest planning. A description of each subsection on the Forest follows.

Basin and Range Transitional Mountains (M331Du)

This subsection consists of two primary landscape settings. First, the mountain ranges are located on high elevation sites with slopes ranging from thirty to seventy percent. These landscapes include mountain slopes and ridges that are formed in sedimentary parent materials. The soils are shallow (less than twenty inches to bedrock) to deep (forty to sixty inches to bedrock) and are well drained. The soils associated with sagebrush/maple communities are shrub land soils with thick dark surfaces, often with a layer of clay accumulation below the surface that helps retain water and minerals. The soils associated with the drier Douglas-fir communities are similar to grassland/shrub land soils. They also have thick, dark surfaces, often with clay accumulations below the surface.

The narrow valleys are located on mid-elevation sites with slopes ranging from five to twenty percent. These landscapes include narrow canyons and valleys that are formed in sedimentary parent materials. The soils are deep (forty to sixty inches to bedrock) to very deep (greater than sixty inches to bedrock) and well[1] to somewhat poorly drained.[2] The soils associated with willow/sedge and sagebrush communities have thick to very thick dark surfaces (greater than sixteen inches) with loam or sandy loam textures.

Principle ecological concerns affecting soil quality are expansion of big-toothed maple and Utah or Rocky Mountain juniper into sagebrush and mountain-brush communities, the aggressive spread of noxious weeds, and the increased susceptibility to fires.

The principle management activities affecting soil quality are roads, logging, mining, and livestock grazing. Perlite and pumice mining occurs near Wright Creek.

Portneuf Uplands (M331Db)

This subsection also consists of two primary landscape settings. The mountains are located on mid-to-high elevation sites with slopes ranging from thirty to seventy percent. These landscapes include ridges, steep mountainside slope landforms that were formed in Paleozoic sedimentary materials. The soils are shallow (less than twenty inches to bedrock) to deep (forty to sixty inches to bedrock) and well drained. Soils associated with Douglas-fir

---

1 **Well drained**—Water is removed from the soil readily. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

2 **Somewhat poorly drained**—Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season.

communities have a dark surface usually with a clay accumulation just below the surface or deeper, which indicates a stable landscape for many years. Soils associated with mountain big sagebrush communities have dark surfaces with silty or loamy textures.

The narrow valleys are located at the lower elevation sites with slopes ranging from five to thirty percent. These landscapes include bottomlands and stream terrace landforms that are formed in alluvial materials. The soils are deep (forty to sixty inches to bedrock) to very deep (greater than sixty inches to bedrock) and somewhat poorly drained. The willow-sedge community types have soils with either irregular, freshly deposited dark surfaces or more stable, very thick, very dark surfaces.

Principle ecological concerns affecting soil quality are the expansion of Utah or Rocky Mountain juniper into sagebrush and mountain brush communities, the increased susceptibility to fires and spread of noxious weeds.

The principle management activities affecting soil quality are roads, prescribed fire, recreation, and livestock grazing.

Cache Valley Front (M331Dc)

This subsection consists of two primary landscape settings. The mountainsides are located on mid-to-high elevation sites with slopes ranging from fifty to ninety percent. These landscapes include ridges, mountain slopes, and block fault faces that are formed in sedimentary parent material. The soils are shallow (less than twenty inches to bedrock) to deep (forty to sixty inches to bedrock) and well drained. The subalpine fir and Douglas-fir vegetation have soils with dark surfaces, some thick, and consistently formed clay accumulations just below the surface layer or beginning below twenty-four inches in depth. These deep clay accumulations indicate relatively "old" stable soils.

The canyons are located throughout the subsection with slopes ranging from fifty to ninety percent. These landscapes include steep mountain faces and canyon walls generally with streams in the bottoms. They formed in sedimentary parent materials. The soils are shallow (less than twenty inches to bedrock) to moderately deep (twenty to forty inches to bedrock) and well drained. The mountain big sagebrush, curlleaf mountain mahogany, limber pine, and Douglas-fir vegetation are found over soils with dark surfaces, some thick, and occasionally soils with a clay accumulation below the dark surface.

Principle ecological concerns affecting soil quality are expansion of big-toothed maple into sagebrush and mountain-brush communities, increased susceptibility to fires, and spread of noxious weeds.

The principle management activities affecting soil quality are roads, power lines, recreational developments, logging, fires, and livestock grazing.

Bear River Karst Highlands (M331Dd)

This subsection consists of three primary landscape settings. First, the mountains are located at all elevations with slopes ranging from ten to sixty percent. These landscapes include ridges and mountain slopes that are formed in sedimentary parent materials. The soils are shallow (less than twenty inches to bedrock) to very deep (greater than sixty inches to bedrock) and well drained. Soils on the ridges are shallow, and the mountain slopes and foothills have moderately deep to very deep soils. Aspen, Douglas-fir, and sagebrush vegetation are associated with soils that have dark surfaces, some thick, and some with a clay accumulation that begins just below the dark surface or others with clay deep in the soil profile.

Next, the broad valleys at high elevations have slopes ranging from five to thirty-five percent. These landscapes include bottoms and plateaus on the top of the mountain crest formed in sedimentary materials. The soils are very deep (greater than sixty inches to bedrock) and somewhat poorly drained to somewhat excessively drained.[3] The tall forb and sagebrush communities are found in soils with dark surfaces and clay accumulations just below the loam or silt loam textured surfaces.

The lower elevation foothills have slopes ranging from ten to fifty percent. These landscapes include rolling hills, fans, and mountain foothills formed from sedimentary parent materials. Soils are deep (forty to sixty inches to bedrock) to very deep (greater than sixty inches) and well drained. The sagebrush, mountain bush, and aspen cover types are associated with soils that have dark surfaces, mostly thick, and clay accumulations below the loamy or silt loam surfaces.

Principle ecological concerns affecting soil quality are conifers expanding into aspen, sagebrush/grass and riparian communities, loss of the tall forb community and replacement with annual tarweed, spread of noxious weeds, and increased susceptibility to fires.

The principle management activities affecting soil quality are roads, livestock grazing, logging, fire, and recreation.

Preuss Ridges and Hills (M331Df)

This subsection consists of two primary landscape settings. The ridges are located on mid-to-high elevation sites with slopes ranging from fifteen to sixty percent. These landscapes include mountainsides and ridges that formed in sedimentary materials. The soils are shallow (less than twenty inches to bedrock) to deep (forty to sixty inches to bedrock) and well drained. Subalpine fir vegetation is associated with soils that have light-colored surfaces and relatively little development. The sagebrush vegetation communities are associated with soils that have dark surfaces and clay accumulations just below the loamy, textured surfaces.

3 **Somewhat excessively drained**—Water is removed from the soil rapidly. Soils are commonly coarse-textured.

The low-to-mid elevation rolling hills and valleys have slopes ranging from fifteen to forty percent. The landscapes include valley marsh areas formed in alluvium. The soils are deep (forty to sixty inches) to very deep (greater than sixty inches) and well- to poorly-drained.[4] Principle soils have dark, often thick surfaces and clay accumulations just below the surfaces. Soils associated with the wetland vegetation of Elk Valley Marsh have dark surfaces with high amounts of organic matter similar to peat.

Principle ecological concerns affecting soil quality are conifers expanding into aspen, sagebrush/grass, and riparian communities; loss of the tall forb communities and invasion of annual tarweed; the spread of noxious weeds; and increased susceptibility to fires.

The principle management activities affecting soil quality are roads, logging, livestock grazing, fire, and recreation.

Webster Ridges and Valleys (M331Dg)

This subsection consists of two major landscape settings. The mountain ridges are found at low-to-high elevations with slopes ranging from ten to sixty-five percent. These landscapes include mountainsides, canyons and ridges formed from sedimentary rocks. The soils are shallow (ten to twenty inches to bedrock) on the ridges and upper canyon slopes to very deep (greater than sixty inches to bedrock) on the mountainsides and lower canyon slopes. Soils are well drained. Subalpine fir and lodgepole pine community types are associated with soils that have light-colored surfaces and little other development and soils with slightly darker surfaces with a clay accumulation below the surface. Big sagebrush communities are associated with soils that have thick, dark surfaces and a clay accumulation just below the surface layer.

The valleys have slopes of less than ten percent. These landscapes include valley bottoms and canyons that are formed in alluvial and residual parent materials. The soils are very deep (greater than sixty inches to bedrock) and well to poorly drained. Willow and wetland vegetation, aspen, and sagebrush communities are associated with soils that have thick to very thick dark surfaces and often contain an accumulation of clay just below the surface.

Principle ecological concerns affecting soil quality are conifers expanding into aspen, sagebrush/grass, and riparian communities; the spread of noxious weeds; increased susceptibility to fires; and selenium contamination from mining.

The principle management activities affecting soil quality are phosphate mining, logging, road building, recreation, and livestock grazing.

4 **Poorly drained**—Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods.

CARIBOU RANGE OVERTHRUST MOUNTAINS (M331Di)

This subsection consists of two major landscape settings. The high elevation mountain ranges have slopes ranging from twenty to forty percent. These landscapes include ridges, mountain slopes, and canyons that are formed in sedimentary, intrusive,[5] and metamorphic rocks. The soils are shallow (zero to twenty inches to bedrock) to deep (forty to sixty inches to bedrock) and well drained. Subalpine fir community types are associated with soils that have a light-colored surface and little other development. Sagebrush communities are in soils with thick dark surfaces and clay accumulations just under the silt loam or loam surfaces.

The valleys are located on low-to-mid elevation sites with slopes ranging from five to thirty percent. These landscapes include draws and open basins that formed in sedimentary rocks. The soils are moderately deep (twenty to forty inches to bedrock) to very deep (greater than sixty inches to bedrock) and well drained. Sagebrush, grass, and riparian communities are found in soils that have a dark to thick, dark loam or silt loam surface and normally a clay accumulation just below the surface.

Principle ecological concerns affecting soil quality are conifers expanding into aspen, sagebrush/grass and riparian communities, loss of the tall forb communities and invasion of annual tarweed, spread of noxious weeds and the increased susceptibility to fires.

The principle management activities affecting soil quality are recreational gold dredging, roads, logging, and livestock grazing.

SOIL PRODUCTIVITY

Federal law requires the Forest Service to protect the long-term site productivity of National Forest System lands and ensure that irreversible damage will not occur. Soil productivity and soil quality on the Forest are generally stable, but some areas, associated with management actions, show declines. Localized declines are directly associated with increasing loss of soil from erosion and displacement, loss of fine litter and coarse woody debris, changes in vegetation composition, and increases in bulk density from compaction. Localized reductions in soil productivity have occurred due to timber harvest, recreation activities, prescribed fire and livestock grazing. Soil losses have occurred with construction of roads, landings, and facilities, mineral activities, and developed recreational sites.

Landslides and landslide prone areas are found in many places on the Forest. Landslide prone areas have been mapped in the Soil Survey of the Caribou National Forest (USDA-FS, 1990). These features can be readily found in the Caribou Overthrust Mountains subsection and the Preuss Ridges and Hills subsection. Landslide prone areas are important to landform and stream channel morphology and can affect long-term soil productivity.

5 **Intrusive**—Igneous rock formed by emplacement of magma in pre-existing rock.

SOIL MICROBIOTIC CRUSTS

Microbiotic crusts (also known as cryptogams) sometimes occur in forested and non-forested understories. Microbiotic crusts are formed from living organisms and their by-products, creating a surface crust of soil particles bound together by organic materials. They are predominantly composed of cyanobacteria (formerly called blue-green algae), green and brown algae, mosses, and lichens. Liverworts, fungi and bacteria also can be important components. Because microbiotic crusts are concentrated in the top one to four millimeters of soil, they affect processes that occur at the soil-air interface, including soil stability, erosion, atmospheric nitrogen fixation, nutrient contributions to plants, soil-water relationships, water infiltration, soil fertility, seeding germination and plant growth (USDA-NRCS, 1997). Disturbances, such as livestock grazing, fire and mechanical treatments may alter the role microbiotic crusts play in the ecosystem.

Microbiotic crusts usually form on arid and semi-arid lands in open bare soil spaces between plants. They form in all hot, cool, and cool arid and semi-arid regions (USDI, 2001). In rangelands, they function as living mulch by retaining soil moisture and discouraging annual weed growth. They reduce wind and water erosion and contribute to soil organic matter. In sagebrush communities, microbiotic crusts are less dense due to dense vascular vegetation and accumulation of plant litter (USDI, 2001; NRCS, 1997; USDA-FS, 1999). In some sagebrush types the ground cover contains high amounts of litter but relatively low cryptogam cover (Shiflet, 1994).

Hot ground fires generally kill microbiotic crusts; however, historic fire regimes usually allow enough time for crustal organisms to recolonize. Recovery of microbiotic crusts and vascular plants after treatments is dependent on protection of these sites from disturbances for a period of time.

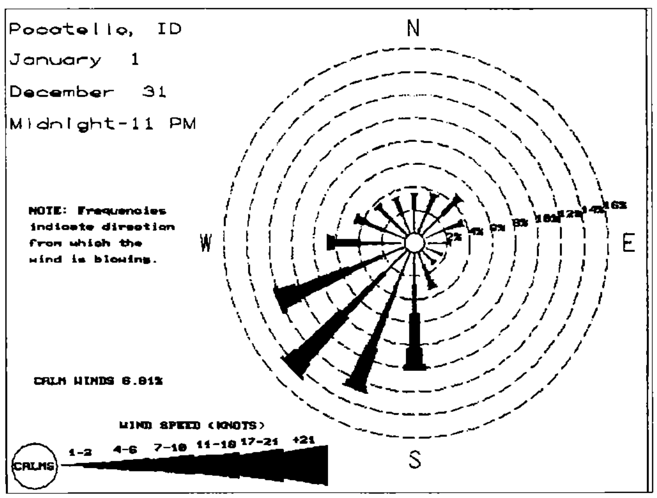
Microbiotic crusts are recognized as an important aspect of soil quality. These crusts, along with fine organic matter, are important features in maintaining soil quality by reducing erosion. Management direction is provided to maintain these important features of soil quality. As more information becomes available on how microbiotic crusts respond to management activities, adaptive management will be applied to protect or enhance their development. Microbiotic crusts will not be discussed further.

CLIMATE

Major topographic features including the Pacific Coast Mountain Ranges (i.e., Sierra Nevada and Cascade Range) and local mountain ranges influence the climate on the Caribou National Forest. Local mountain ranges trend north and south and are perpendicular to the prevailing eastward airflow, affecting wind, precipitation, and temperature patterns (Ross, *et al*, 1967). The lowest elevations have a desert-like climate. Higher elevations have a continental-like

climate.[6] The highest elevations above 9,000 feet (2,445 meters) have a near polar climate (Abramovich, *et al*, 1998). Mean annual precipitation ranges from twelve inches (305 mm) to greater than forty inches (1,020 mm), depending on elevation. Mean annual air temperatures range from 46° F (8°C) near Pocatello to 29° F (-2°C) at the highest elevations. Frost-free days range from 142 days at Pocatello to fewer than sixty days on the mountaintops (USDC Weather Bureau, 1959). Wind rose information for Pocatello, Idaho, indicates that the prevailing wind direction is from the southwest (See Figure 3.1). Strong canyon winds that funnel into Pocatello often occur through the Portneuf Canyon.

Figure 3.1. Wind Rose for Pocatello, Idaho



From Marilynne Manguba,
Idaho National Engineering and Environmental Lab, 1999

Climates are cyclical. The "Little Ice Age", which culminated during the 1700s and early 1800s, was a period of cooler temperatures (Tausch, *et al*, 1993). Historically between 1880 and 1920, the western United States experienced more arid conditions with many heavy, erosive thunderstorms, and fewer, light, soaking showers. During the last few decades however, the west has changed, on average, to a cooler year-round climate with more precipitation. It is suggested that, because of these climatic cycles, the west is trending again toward a more arid climate in the coming decades with more intensive thunderstorms occurring (Leopold, 1994). Climatic cycles affect ecosystems because of changes in temperature, precipitation, and drought events (Luce, *et al*, 1995). None of the alternatives would change climate; therefore, it will not be discussed further.

GLOBAL CHANGE

Over the past few decades, carbon monoxide emissions and the "greenhouse effect" are assumed to have caused a warming trend of one to three degrees Fahrenheit globally (UCRB

6 **Continental** climate occurs where winters are colder with longer lasting snow and shorter growing seasons. It is the transition zone between mild climates and polar climates.

Draft EIS, 1997). Greenhouse gas emissions could cause a rise in global temperature from 1.8^0 to 6.3^0 Fahrenheit in the next 100 years if atmospheric levels are not reduced (EPA, 1998).

Carbon dioxide accounts for the largest amount of greenhouse gases in the United States. Methane is the second largest contributor. Burning vegetation releases carbon dioxide into the atmosphere but is not listed by the EPA as a primary cause of greenhouse gasses. The largest contributor of carbon dioxide is the burning of fossil fuels in electric power generation. Vegetation of the Forest sequesters carbon as the biomass becomes re-established and abundant. This process acts as a sink for carbon. As vegetation burns, carbon dioxide is liberated. This cycle of biomass establishment and burning creates a carbon balance (Andreae, 1991). A carbon build-up occurs as biomass from trees, shrubs, forbs, and grasses increase on the Forest. Because fires have been suppressed on the Forest for the past eighty to ninety years and fewer acres burn today than burned historically, the Forest is accumulating carbon from the build-up of biomass. Carbon sequestration is a viable method of reducing CO_2 in the atmosphere (EPA, 1998).

Because the scale of this issue is global and the Forest is one minute part of this global scale, calculations of climate change for this specific area are much less reliable than at a global scale, and it is unclear whether regional climates will become more variable (EPA, 2002). An assessment of what management activities, such as prescribed burning, would have on global change, especially from a cumulative effects perspective would be unreliable. This lack of available information would not change the decision about future management on the Forest. The effect of global climate change on forested ecosystems is well documented (Joyce, *et al*, 2000; Wagner, *et al*, 1998; Bytnerowics, *et al*, 1998; EPA, 1998). The Forest Service is continuing to study the effects of forest management actions on global change, but no official policy has been formulated on how global change should be addressed in the forest planning process. Smoke emissions from forest management activities are disclosed in Chapter 4 of the EIS.

All alternatives would have the same, immeasurable affect on global climates. This will not be discussed further.

WATERSHEDS

The Caribou National Forest lies mainly within the northern extent of the Great Basin and the southeastern portion of the Pacific Northwest Region. In general, it is an area of relatively low precipitation, where annual evaporation potentials exceed precipitation.

Mountains rise sharply from the semi-arid sagebrush plains and alluvial[7] valleys. These uplifts have been modified through folding, faulting, downcutting, erosion, glaciation, and

7 **Alluvial** pertains to a natural process associated with transportation and deposition of material by concentrated running water.

landslides. Rock types are mostly sedimentary[8] formed on the bottom of ancient oceans. Limestone, dolomite, shale, siltstone, mudstone, sandstone, and minor amounts of conglomerates are the major rock types found throughout the area. Some igneous volcanic intrusions, lava flows, and ash deposits are found on the Forest. Large phosphate ore deposits are found in the central portion of the Forest, mostly within the Blackfoot River drainage. Natural flora consists of plant species that are adapted to cold winters and relatively dry summer conditions. Vegetation distribution is controlled by elevation, aspect, climate, geology, soil type, and available water.

Watersheds are the natural hydrologic boundaries for surface-water runoff. Since they are definable features on the landscape, they are broadly used as spatial boundaries for investigations of surface-water resources (Maxwell, *et al*, 1995). Watersheds throughout the United States have been defined by the United States Geological Survey and are used by the U. S. Water Resources Council and others for comprehensive planning and investigations. A standardized system of Hydrologic Unit (HU) watersheds divides the United States into 21 Regions, 222 Subregions, and thousands of smaller units. A hierarchical hydrologic unit code (HUC), consisting of two digits for each level in the hierarchical unit system, is used to identify any hydrologic area of interest (USGS, 1987).

The Caribou National Forest lies within two major watershed Regions (1st Code HUC). The northern portion of the Forest, from Soda Springs to the north, is within the Pacific Northwest Region, which contains the smaller Upper Snake River Subregion (2nd Code HUC). The southern portion of the Forest, from Soda Springs, and to the south, is within the Great Basin Region, which contains the Great Salt Lake and Bear River Subregions. The Subregions can be further broken down into smaller Basins (3rd Code HUC), Subbasins (4th Code HUC), Watersheds (5th Code HUC) and Subwatersheds (6th Code HUC). The Caribou National Forest portion of the Upper Snake River Subregion includes the Blackfoot River, Portneuf River, Willow Creek, American Falls, Palisades, and Salt River subbasins. The Central Bear River, Bear Lake, Middle Bear River, Lower Bear/Malad River, and the Little Bear/Logan River subbasins are in the Great Salt Lake and Bear River Subregions. Within these eleven Subbasins, approximately fifty 5th Code HUC Watersheds and about one hundred and fifty 6th Code HUC Subwatersheds have been delineated within the boundaries of the Caribou National Forest. Watersheds can be further broken down into smaller HUCs on an as-needed basis (See Watershed section).

Several decades ago the Forest was subdivided into Project Work Inventory (PWI) watersheds. One purpose for the subdivision was to define watersheds of a size suitable to determine effects at a watershed scale. The size of the PWI watersheds falls between the today's 4th and 5th code HUC delineation. The Forest is comprised of twenty-six PWI watersheds, which were used in the 1985 Forest Plan as "management areas." In order to provide a linkage between the 1985 Forest Plan and revised Forest Plan, the PWI watersheds have been carried forward and used to describe effects of proposed management in this Final Environmental Impact Statement. Map 3.2 displays the PWI watersheds in relationship to today's 4th HUC watersheds.

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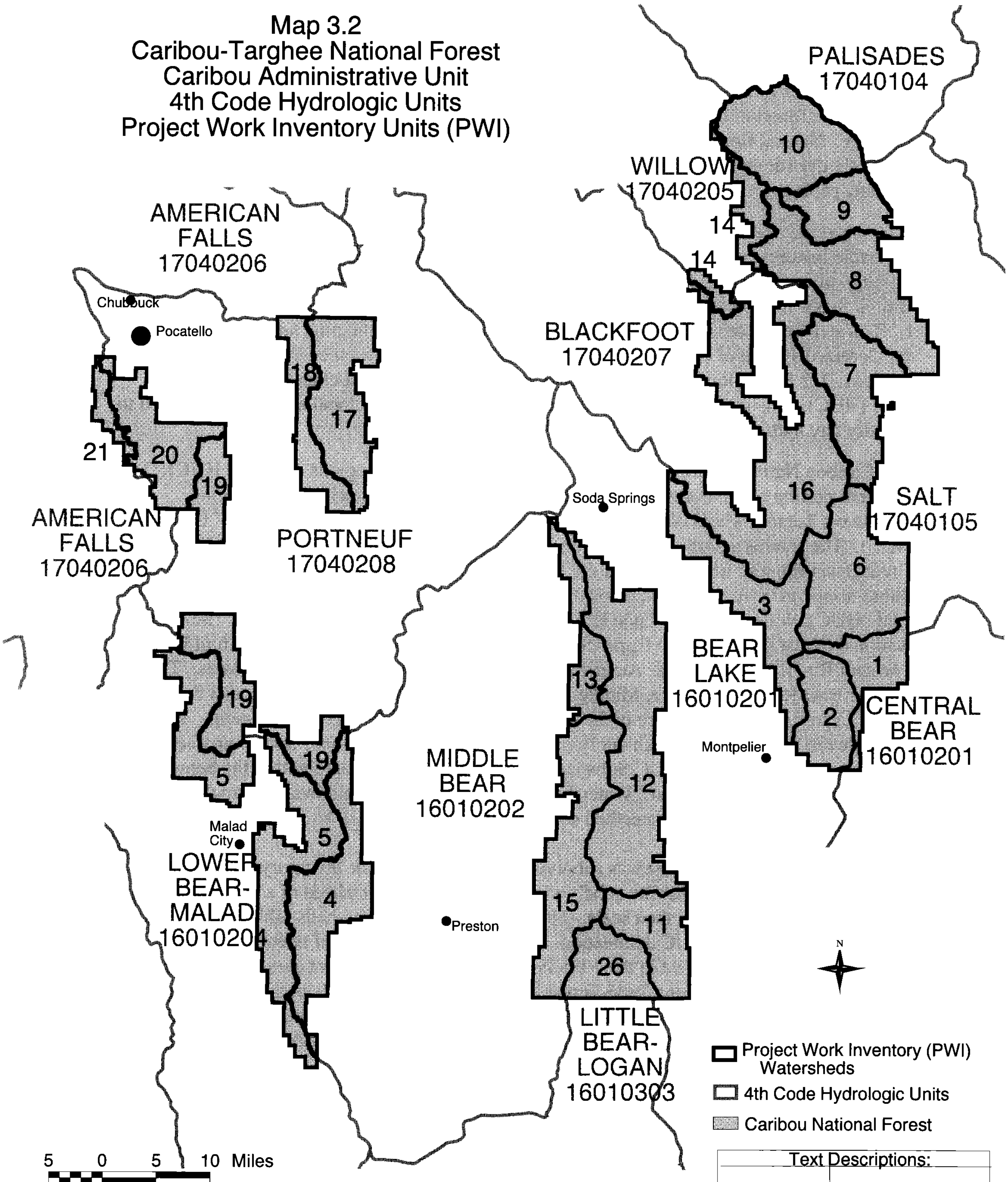
8 **Sedimentary rocks** are formed of sediments, chemical or organic, generally transported from their source and deposited elsewhere by water or wind.

Map 3.2
Caribou-Targhee National Forest
Caribou Administrative Unit
4th Code Hydrologic Units
Project Work Inventory Units (PWI)



Text Descriptions:	
HUC4 Label	PORTNEUF 17040208
PWI Label	14

Issue 1

Recreation, Access, and Scenery Management

Analysis Scale: Forest-wide

Issue:

Forest Plan Alternatives will affect recreation settings and access.

Indicators:

♦ **A.1 Recreation Opportunity Spectrum (ROS) shown in percentage of acres in each class.**

Baseline Indicator:

Primitive = 1%

Semi-primitive Non-motorized = 18%

Semi-primitive Motorized = 46%

Roaded Modified = 15%

Roaded Natural = 20%

♦ **A.2 Estimated acres open to cross-country motorized use during the snow-free season.**

Baseline Indicator: Approximately 420,215 acres (~40%) of acres

♦ **A.3 Motorized and Non-motorized route opportunities**

Baseline Indicator: Approximately 1, 013, 300 acres or ninety-seven percent open to over-the-snow motorized travel.

Baseline Indicator: Approximately 2,033 miles of open, motorized routes of which 950 are open motorized trails.

BACKGROUND TO ISSUE

The following discussion addresses recreation and travel management on the Caribou National Forest (CNF). The discussion includes the existing condition of the CNF recreation use, facilities and travel management. It provides descriptions of existing laws, regulations, and policies by which recreation and travel is managed, management concerns regarding recreation, and what factors will be used to indicate how recreation and recreational travel will be affected by each alternative. Recreation management is interrelated to other issues and concerns. Other topics closely related to recreation and travel access include Transportation Facilities, Roadless Areas, Scenery, Heritage, and recommended Wilderness.

Recreation and travel access are closely related topics. Most of the travel on the Forest's roads and trails is for leisure. The majority of public comments regarding recreation relates to the type and degree of recreation travel management, often falling into the motorized or non-motorized categories. Generally, people want their type of recreation promoted and expanded, while other types should be restricted or not emphasized. Some people want more areas managed for non-motorized uses exclusively and others want to have no loss of or an increase in motorized recreation opportunities. Some recreation comments were not travel

access related. Comments suggested the need for more recreation information, improved facilities, and improved monitoring of recreation effects to soil, vegetation and wildlife.

Factors affecting recreation management on the Caribou include:

- A rapidly growing, aging urban population
- Recreation facilities that are deteriorating from age and/or overuse
- Increased dispersed recreation use creating a need for resource monitoring and protection
- New technologies that are changing or increasing access and use of the Forest (Cordell, Bergstrom, Hartmann and English, 1989)
- Growth and diversification of winter recreation.
- New business practices that augment traditional funding for operation, maintenance, and construction of recreation infrastructure and programs, such as fee demo programs, partnerships, volunteers, grants and concessionaires.

National Forests have a unique "niche" of nature based, dispersed recreation to offer, including undeveloped settings, built environments reinforcing the natural character, and wildland settings that complement enjoyment of these special places. The National Forest System provides high quality outdoor recreational opportunities throughout the nation. Recreation opportunities provide the state economy with jobs, income and other benefits. (USDA Forest Service Recreation Agenda, 2000, pp3)

Apart from providing business and job opportunities, outdoor recreation contributes other benefits to society. The American Recreation Coalition reported that Americans who participate in outdoor recreation during childhood and adulthood have an overall better quality of life than others (ARC, 1996). In addition to contributing recreation activities, the National Forests provide scenic and pleasing surroundings prized by millions of Americans who want to live and work in a rural setting.

The Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (Idaho, SCORTP, 1998) is an integrated assessment of recreation and tourism for the state. The assessment uses resident and non-resident travel and recreation studies, an inventory of statewide recreation facilities and services and user group surveys to assess the strengths and weaknesses of Idaho's recreation and tourism infrastructure. This discussion uses the assessment and nation-wide studies to assess the recreation opportunities of the CNF.

Current Conditions

RECREATION

Idaho's landscapes are diverse, from the rugged northern and central mountain ranges to the Snake River Plain. Over 63 percent of Idaho land is public land, and much of that land is forested. Statewide, outdoor recreation opportunities are diverse and abundant.

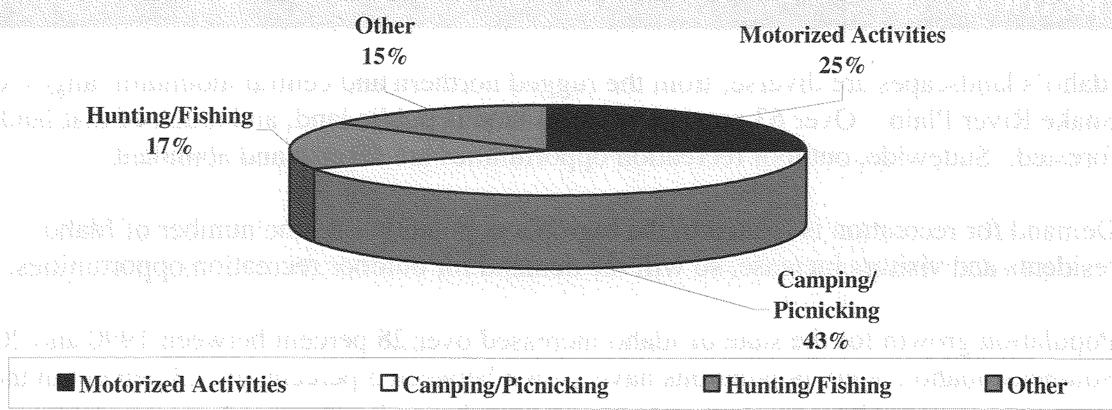
Demand for recreation is related to the region's population. As the number of Idaho residents and visitors increase, so will the demand for outdoor recreation opportunities.

Population growth for the state of Idaho increased over 28 percent between 1990 and 2000. Southeast Idaho county populations have grown between 5 percent and 23 percent in the same time frame. Other western state populations have also increased, most notably Washington, Oregon and Utah. (2000 U.S. Census Bureau) At current growth rates, recreation use is expected to double in the next thirty-one years in the Upper Columbia River Basin (USDA-FS/USDI BLM, 1996).

The Caribou reported over 900,000 recreation visits in 1998, (RIM Use Report). Tourists often visit the Forest as part of a trip to Yellowstone and Teton National Parks. Residents of Southeast Idaho enjoy the unique settings of a National Forest close to home. The southern portions are within an hour's drive of the Wasatch Front metropolitan area and are very popular with Utah visitors. Looking at past growth in recreation visits and projected area population growth, it is likely that recreation visits will continue to increase annually between one and four percent.

The Forest reported over 900,000 recreation visits for 1998; this represents a four percent annual increase since 1980. Forest use figures are based on personal observations of forest staff and fee receipts from campgrounds and recreation special uses. Figure 3.2 displays the percentages of various recreation uses on the forest.

Figure 3. 2 Percentage of Recreation Uses.



RECREATION USE ON THE CARIBOU

The Caribou National Forest is administered by three Ranger Districts: the Westside Ranger District with offices in Pocatello and Malad, the Soda Springs Ranger District in Soda Springs and the Montpelier District in Montpelier, Idaho.

The Westside District consists of mountains and valleys bisected by Interstate 15. These "islands" of forested land are easily reached from Interstate 15. These forest areas receive "transient" use from tourists passing through south to Salt Lake City or traveling north to the Yellowstone country.

Much of the Westside District is under an hour's drive from the population center of Pocatello. Due to proximity to the City of Pocatello, the District is more popular for snowboarding, skiing and mountain bike use than other portions of the forest (Forest RIM data and staff observation). Pebble Creek Ski Area is 45 minutes from Pocatello and offers downhill ski and snowboard opportunities. Mink Creek, just south of Pocatello, offers numerous cross-country ski opportunities. Snowmobiling is also very popular throughout the District.

Numerous trails leave the city limits of Pocatello and traverse through BLM, private or city property onto the forest. During the snow-free season, these trails receive heavy use by mountain bikers, hikers, runners, ATVers, and motorcyclists on weekdays and weekends.

The Soda Springs Ranger District administers the northern portion of the Caribou Highlands and offers more remote recreation opportunities. Stump Creek and Caribou Mountain areas provide primitive and semi-primitive settings for big game hunting, motorized trail use, and back-packing. The remote Tincup Highway, part of the Bear-Lake-Caribou Scenic Byway, offers small campgrounds and rustic trails, both motorized and non-motorized. This area is very popular for archery and rifle hunts for elk and mule deer.

The Montpelier District administers the southern portion of the Caribou Highlands and the northern portion of the Bear River Range. These areas offer "Roaded Natural" and "Semi-Primitive Motorized" settings. Bear Lake is a tourist destination and the adjacent Bear River Range offers campgrounds in a forested setting, numerous trail opportunities, and climatic relief from Bear Lake itself, which gets hot and windy most mid-summer afternoons. Minnetonka Cave and Bloomington Lake are important tourist attractions to the Bear Lake Valley and valley residents. The Bear River Range is also very popular for snowmobiling. Numerous parking lots and groomed trails attract snowmobilers region-wide.

The southern portions of the Forest, on both the Westside and Montpelier Ranger Districts receive "over-flow" recreation use from Wasatch Front residents. As the Salt Lake City metropolitan area grows and spreads northward towards the Idaho-Utah border, Forest use from Utah residents increases. Utah residents use the southern portions of the Forest for dispersed camping, hunting, ATV use and snowmobiling.

To match the diversity of recreation interests with appropriate opportunities, the CNF offers a variety of settings. Recreation settings are categorized by the amount of development and other attributes using a planning tool called Recreation Opportunity Spectrum (ROS). The ROS uses seven recreation classes that vary by activity type, levels of management and development, and differences in natural settings. Recreation use is allocated using the ROS classes. These allocations help visitors find the setting that best provides for their desired experience. Table 3.2 displays the existing summer, or snow-free ROS classes and existing winter or snow season ROS opportunities by acre for the CNF. Existing conditions for Winter Recreation Opportunities were mapped separately from Summer ROS. Winter Recreation Opportunities were derived from the current Travel Management Plan. See Appendix B and Project File, Recreation for more information on summer and winter ROS mapping and complete descriptions of ROS classes.

Table 3. 2 Existing Estimated Acres by ROS Category for the Snow-free Season on the CNF.

ROS Category	Acres	Percent of Forest Acres
Primitive	9,478	1%
Semi-primitive Non-motorized	188,874	18%
Semi-primitive Motorized	477,318	46%
Roaded Modified	154,644	15%
Roaded Natural	211,773	20%
Snow Season-SPNM	32,100	3%
Snow Season- SPM	1,009, 985	97%

Caribou Mountain is the only area on the Forest that offers a Primitive recreation setting since it is three miles from a roaded area. The lack of Primitive areas on the Forest is due to topography, mixed land ownership patterns, and the presence of motorized roads and trails. Areas of moderate size that emphasize a semi-primitive non-motorized setting include Bear Creek, Caribou Mountain, Toponce, Pebble Creek Basin, Mt. Naomi, and Worm Creek. Semi-primitive motorized areas that include motorized trails can be found in many areas of

the Forest. Roaded Modified and Roaded Natural areas also provide motorized experiences in a setting with more development than semi-primitive settings.

Recreation managers divide recreation sites and activities into two broad categories - Developed and Dispersed. Developed recreation sites are areas of concentrated development, such as a campground or trailhead with improvements. Dispersed recreation occurs outside of concentrated use areas, such as motorized and non-motorized trail use or camping and picnicking outside of established campgrounds and day-use areas.

DEVELOPED RECREATION

The Forest offers over sixty developed recreation sites, including campgrounds, ski areas, organization camps and cabin rentals. The area offers over four hundred developed camp units and fifteen group areas. Some developed facilities are managed and maintained by private business, under a special use authorization. Other developed sites are operated under the Fee Demo Program. This program, under temporary Congressional legislation, allows the managing unit to retain use fees and invest them in the maintenance and operation of the area from where they were generated. Traditionally, all use fees collected at developed sites go to the Federal Treasury. The Fee Demo Program helps maintain and operate popular developed sites at the local level.

According to staff observations and fee records, many of the Forest's developed sites are full on summer weekends and holidays. New developed recreation sites are generally not considered, due to the challenges of funding new construction and the limited funds to maintain and operate existing facilities. Relocating facilities out of riparian zones and rehabilitating existing facilities has been the priority over building new sites. Steep terrain or adjacent riparian areas also limit increasing campground capacities.

At certain times of the year, demand exceeds developed site capacities at several campgrounds. In light of projected population growth for the region, visitation is expected to increase, causing some visitors to be displaced or unable to find their desired recreation setting. Displaced visitors often move to dispersed campsites in close proximity to developed campgrounds. This pattern can adversely affect the soil, vegetation and water quality of these adjacent areas.

Developed facilities are often operated by private or non-profit entities under special use authorizations. Recreation special uses include outfitter and guide operations, one tract of recreation residences, organization camps and ski areas. A private business under a special use permit operates and conducts daily tours of Minnetonka Cave, a developed limestone formation cavern. District offices receive an average of eight inquiries annually regarding potential special use authorizations. It is expected that requests for recreation-based special uses will increase, as it has on adjacent Forests. Due to the increase in recreation special use authorizations nation-wide, the agency has implemented a two-step process that will eliminate use proposals that do not meet the intent of the Forest Plan or management area objectives (36 CFR 251, Subpart B).

Dispersed Recreation

Dispersed recreation includes hiking, biking, scenic driving, hunting, horseback riding, fishing, OHV use, snowmobile use and cross-country skiing.

Dispersed camping occurs along the larger streams and rivers of the Forest. Popular dispersed camp areas include Pebble Creek, Eightmile Creek, Bloomington Canyon, Cub River, Crow Creek and Summit Canyon. Signs, fencing and rock barriers have been installed in many areas to protect stream banks and vegetation from vehicle impacts. In St. Charles Canyon dispersed camping is allowed only in designated areas.

Public comments during the Forest's planning process identified several conflicts between recreation use and other resource uses, including the evidence of livestock on trails and in popular dispersed camp areas within the Mink Creek Recreation Area, in Bloomington Canyon, and in St. Charles Canyon.

Hunting is very popular on the Forest. People participating in the fall big game hunts place a high demand on developed and dispersed campsites and road and trail systems of the Forest.

Trails Management

Forest trails are managed for multiple uses, but not all uses are accommodated on all trails. An increased demand for trail activities has placed a greater emphasis on trail system planning and monitoring. Trail condition surveys and GPS mapping are currently being accomplished on the Forest's trail system. Initial results indicate that many trail segments need heavy maintenance to improve water drainage and/or relocation out of riparian areas.

All terrain vehicles (ATV) have grown in popularity during the past decade, increasing the demand to accommodate this type of recreation. In Idaho, 95 percent of ATV and motorbike riding opportunities is on National Forest or other public land (Idaho Parks and Recreation, 2002). In 1996 there were 27,725 ATVs and motorbikes registered in the State of Idaho. In 2000, the total was 51,042. This is an 84 percent increase in four years (Idaho Parks and Recreation, 2002). Some of this increase can be attributed to improved compliance with the registration program, but most of the growth reflects the actual increase in OHV ownership and use. In southeast Idaho alone, ATV and motorbike registration has increased 16 percent in the past year. To date, there are 8,574 OHVs registered in southeast Idaho (Travel Regions 5 and 6) (Idaho Parks and Recreation, 2002). This dramatic increase has led to conflicts with other users and resource protection. Many of the Forest's trails are not designed to accommodate the larger, wider ATVs being manufactured today. There is also a growing concern about cross-country motorized use causing adverse resource impacts on public lands. This concern is shared by many land managers, Fish and Game and OHV user groups. The Blue Ribbon Coalition's official position paper cites that: *"The BRC supports the policy of limiting wheel off-highway (OHV) use to existing roads and trails, in areas where cross-country use has been adequately studied and shown to cause adverse impacts."* (Caribou Forest Plan Revision comments, 2001)

One of the most challenging issues for trail managers on the Caribou is where to provide opportunities for motorized and mechanized trail use. All trails are open for hiking, and most are open to horseback riding and mountain biking. The Forest offers approximately 1, 300 miles of summer trails, of which 350 miles (27 percent) are non-motorized and 950 miles (73 percent) are motorized. District staff and partners sign and /or groom 300 miles of snowmobile trail and 54 miles of ski trail. Approximately 200 to 300 miles of trail receive maintenance and clearing each field season. Volunteers and State of Idaho trail rangers accomplish much of this work. In addition, numerous user-created, non-system trails exist, especially in the forested areas that currently allow cross-country motorized use.

There is a growing conflict between hunters on foot and hunters using ATVs. The sound of an ATV may chase deer and elk away from other hunters. Increasing numbers of hunters are actually hunting with their ATVs rather than on foot. This behavior raises concerns of "fair chase" and can reflect poorly on hunting and hunters (Idaho Parks and Recreation, 2001; Caribou Forest Plan Revision comments).

There are also growing conflicts between motorbikes who want to retain single track motorized routes and ATV users who need wider two-track trails, especially in steep terrain. Often trails evolve into two-track routes through repeated ATV use, diminishing the trail experience for motorbike users (Caribou Forest Plan Revision comments).

WINTER RECREATION

Winter in Southeast Idaho can last from November to early March. Snowmobile use, skiing, snowboarding, snow shoeing and sledding are popular activities on the Forest. Pebble Creek Ski Area offers downhill skiing and snowboarding to over 40,000 visitors annually. Southeast Idaho has more than ten developed ski areas within a day's drive. Supply and variety meet current demand.

Southeast Idaho is a national destination for snowmobile users. Most of the Forest currently is open to cross-country snowmobile use. In 1989, Snowmobile registrations for the State of Idaho were 22,300. In 2001, they were 46,800. This is a 110 percent increase in 11 years. Some of the increase can be attributed to improved compliance with the registration program, but most of the growth reflects actual increase in snowmobile ownership and use. The Travel Plan restricts snowmobile use to designated routes in some areas of big game winter range. To provide for a non-motorized winter experience, the travel plan also restricts snowmobile use in some ski trail areas and in the proposed wilderness area of Mt. Naomi. The State of Idaho and local snowmobile clubs help provide groomed trails, signing and warming shelters. State-wide and on the Forest, snowmobile users would like more groomed trails, signing and warming shelters (Idaho, May, 1998).

Cross-country ski use increases annually on the Forest. Nordic ski facilities include plowed parking lots, a hut system, and designated ski trails. Cross-country ski trails in the Pocatello vicinity receive heavy use throughout the week. Several areas are managed for a non-motorized winter experience. Mink Creek Cross-country Ski Area is operated by the City of Pocatello through special use permit and offers six miles of groomed trails. The Portneuf Range Hut System, operated by Idaho State University, offers afternoon or overnight ski

tours. Trail Canyon Winter Sports Area provides ski and snowmobile trails adjacent to a warming shelter. Pebble Creek and Mink Creek ski areas and the hut system are operated under special use permits administered by the Forest.

Many backcountry skiers ride the Pebble Ski Area lift to gain access to the eastern slope of Bonneville Peak. Recent improvements in snowmobile performance now allow snowmobilers to reach the highest slopes of Bonneville Peak. Some skiers would like to see snowmobile use restricted in this area to eliminate conflicts such as noise, fumes, and trail degradation. There is also a concern by some skiers that snowmobiles "high-marking" could cause an avalanche to come down on skiers below. This has not been documented on the Forest, however.

Idaho State University's Outdoor Program and the City of Pocatello help provide ski opportunities and information on the Forest's ski trails and winter safety. Groomed ski trails for beginning and intermediate skiers are in demand regionally and state-wide (Idaho, May 1998). Public comments have indicated a desire for more designated cross-country ski areas and trails, including restricting snowmobile use in some of the areas served by the Portneuf Range Hut System.

INFORMATION, INTERPRETATION AND EDUCATION

Interpretation and environmental education are becoming more important to the mission of the Forest and the agency. The public is interested in understanding the basics of the natural world and its complex interactions to make informed choices concerning public land management. People want to learn about the natural world around them and the stories of significant historic sites and areas. This learning can be part of their recreation experience.

The Forest has two developed sites that offer interpretation of the natural environment to the public. Cherry Springs Nature Area provides educational facilities and interpretive trails. Over 20,000 people annually take the interpretive tour of Minnetonka Cave. Caribou Mountain, Lander Trail, and the Curlew National Grassland are historic areas of high interest to the public but have little interpretive or educational information available.

The Forest does not have a forest-wide interpretive master plan. All Forest offices and a local interagency visitor center offer recreation information and sell environmental education materials, in cooperation with an interpretive association. A need exists for forest-wide trail information and maps by activity, including ATV trails, mountain bike trails, and cross-country ski trails.

TRAVEL

Travel management is the integrated planning and providing for the movement of people and products to and through National Forest System lands. A travel management plan provides clear, specific direction on the type of authorized travel on roads, trails, and cross-country travel on the Forest. Travel management planning on the Forest consists of two stages: 1) the programmatic decision that provides new standards and guidelines and the land management prescriptions related to travel management; and 2) a second level tiered to the programmatic

Forest Plan decision to create a site-specific travel management plan. Forest-wide travel planning was last revised in 1986 to conform to the 1985 Forest Plan. From 1986 to 1996, three environmental assessments considered site-specific changes to the Forest's Travel Plan.

Forest land tracts are scattered over several mountain ranges and are often surrounded by private, BLM or State land. The pattern of fragmented land ownership makes it challenging to manage public road and trail access onto the Forest. Over the last ten years, an average of three rights-of-way has been acquired annually.

Existing roads and trails on the Forest are a combination of planned and unplanned travel routes. Planned roads are designed and constructed to specific standards. User-created, two-track routes and trails are often located in riparian zones, have steep grades and poor drainage. Under the existing travel plan, about forty percent of forest acres, or 420,200 acres, is open to cross-country motorized use. Because of steep terrain and dense vegetation, areas that actually receive cross-country motorized use are less, but the miles of user-created routes in cross-country motorized areas have increased and will continue to increase with improved technology and more powerful machines.

An internal assessment of travel planning looked at ways to improve travel management on the Forest (USDA-FS, 1996, unpublished report). Forest staff considered ways to increase public compliance with the travel plan and reduce resource impacts from road and trail use. The assessment also considered alternative methods to changing and updating the travel plan. Issues and concerns from the assessment included:

- Resource impacts from trails with steep grades, poor drainage and located in riparian zones;
- Trails not safely designed for the wider ATV;
- Cross-country motorized travel creating new travel ways;
- Lack of trail information and signing;
- Enforcement with reduced workforce and funds;
- Effective road and trail closures on-the-ground; and
- Monitoring of road and trail closures

The assessment suggested travel plan compliance could be improved through media outreach that emphasized the resource reasons for travel restrictions, better signing on-the- ground, and cooperative enforcement with the Idaho Department of Fish and Game. The assessment also indicated that travel planning on a site-specific basis would be the most effective process for developing a plan to respond to the needs of a diverse set of user groups.

Bear Lake-Caribou Scenic Byway

The Tincup Highway is the Forest's portion of the Bear Lake-Caribou Scenic Byway. As part of the National Scenic Byway Program, area counties and communities are completing a scenic byway corridor management plan. The plan will provide direction for the development and interpretation of the byway.

SCENIC ENVIRONMENT

The natural-appearing landscapes of the Forest are important to residents and visitors to Southeast Idaho. The 1985 Forest Plan incorporated the Visual Management System (VMS), developed in the 1970's (USDA-FS, Revised 1972), to address landscape management as it applies to scenic quality. Using VMS, Visual Quality Objectives (VQOs) were set for all of the Forest's landscapes. In most cases, the originally inventoried VQOs have been adopted as the management standard. Plan direction is to meet or exceed the given VQO for the project area.

The five established classes of VQOs are Preservation, Retention, Partial Retention, Modification, and Maximum Modification. Each VQO describes a differing degree of acceptable alteration of the natural landscape. VQOs are described in Table 3.3 below.

Table 3. 3. Visual Quality Objectives Descriptions.

Visual Quality Objective	Description
Preservation	Allows ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited. Applies to Wilderness Areas, primitive areas, Wild River corridors, other specialty-classified areas, areas awaiting classification, and some unique management units that do not justify special classification.
Retention	Allows management activities that are not visually evident. Activities may only repeat form, line, color, and texture that are frequently found in the characteristic landscape. Changes in size, amount, intensity, direction, pattern, etc. should not be evident.
Partial Retention	Allows management activities that remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, and texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc. remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or textures that are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.
Modification	Allows management activities that may visually dominate the original characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities, such as structures, roads, slash, root wads, etc. must remain visually subordinate to the proposed composition. Introduction of facilities, such as buildings, signs, roads, etc. should borrow naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are compatible with the natural surroundings.
Maximum Modification	Allows management activities that may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain details that are incongruent with natural occurrences as seed in foreground or middle ground. Introduction of structures, roads, slash, and root wads, etc. must remain visually subordinate to the proposed composition as viewed in the background.

Most of the Preservation acres are within the current Mt. Naomi and Worm Creek recommended Wilderness Areas. Retention and Partial Retention acres are seen from primary and secondary travel ways. Modification and Maximum Modification occur in generally "unseen areas," including areas with active phosphate mining.

A new handbook, ***Landscape Aesthetics: A Handbook for Scenery Management***, was released in 1996 (USDA-FS, December, 1995). National Forests have been directed to use the revised system, called the Scenery Management System (SMS), for project planning. Much of the information needed to create a scenery inventory has already been gathered as part of the 1985 VMS variety class and visibility inventories. Since 1997, project level planning has incorporated the SMS using the VMS inventory data.

Forest plan alternatives will guide management activities that could affect the scenic environment. Plan direction will include VQOs for all landscapes of the Forest. All project level work and use impacts will meet and maintain the specific VQOs for the project area.

RECREATION TRENDS AND USE

The most recent decade has seen changes in the direction of public outdoor recreation. The average age of Americans is rising, while the nation's birthrate is declining. With the aging of the U.S. population, recreation interests are changing. Nationally, ATV and snowmobile use is increasing, as is driving for pleasure (sight-seeing). Mountain biking and cross-country skiing are increasing. Nationally, hiking and walking are increasing. Horseback riding, fishing, and hunting are decreasing (USDA-FS, 1990-1995). Locally, recreation uses are following these national trends (Idaho, May 1997).

Due to the changing employment status of women, vacation patterns have changed over the last decade. Couples with two wage earners have more difficulty arranging for lengthy vacations at remote locations (Frederick, 1991). The annual two-week vacation is being replaced by more frequent three-day weekends. This means vacations occur closer to home as families search for destinations that offer something for everyone.

Other demographic changes include an increase in racial and ethnic diversity and an increase in urban residence (USDA-FS, August 1994). As the American population diversifies, so do its recreational interests. Researchers indicate the only thing predicable in wildland recreation is **change**. Technology will introduce new recreational pursuits. Management should adapt to changing recreation uses on the Forest.

At current growth rates, recreation use will double in the next thirty-one years in the Upper Columbia River Basin (USDA-FS/USDI-BLM, 1996). Population growth for Idaho Travel Region Five (Bannock, Bear Lake, Bingham, Caribou, Franklin, Oneida and Power Counties) is projected to increase by seventeen percent from 1990 to 2015 (Idaho Transportation Department, April 1995). Looking at past growth in recreation visits to the Forest and projected area population growth, it is likely that recreation visits will continue to increase annually between one and four percent.

Issue 2

Social and Economic Environment

Analysis Scale: Caribou Zone of Influence

Issue:

Decisions made in the Forest planning process may result in changes to the economic condition of local communities and may influence regional and national markets.

Indicators:

♦**EC 1** **Changes in jobs**

Baseline Indicator: Current employment (1997 data)

♦**EC 2** **Changes in incomes**

Baseline Indicator: Current income (1997 data)

♦**EC 3** **Present Net Value**

Baseline Indicator: Current program

BACKGROUND TO ISSUE

The analysis scale is the Caribou National Forest Zone of Influence that includes a nine county area in southeast Idaho and Wyoming. A small portion of the southwestern tip of the Forest lies in Rich and Box Elder counties in Utah, but due to the limited area and lack of population surrounding the area, these counties have not been included in this analysis. The analysis of the affected environment is a summary and update of several social and economic documents. Refer to the planning record for the complete documents.

The analysis provides a description of the social and economic environment and trends in the southeast Idaho region surrounding the Caribou National Forest (the Forest). The description of social and economic conditions is similar to more traditional resource inventories and analyses completed for recreation, vegetation, wildlife, fish, minerals, and soils. By understanding trends, changes, and growth in an area dynamic, not static conditions of the human environment are highlighted, knowing that the current situation has not always been and may not always be.

The nine counties that are included in the analysis area represent the region of economic and social relationship and interaction with the Caribou National Forest and its management policies. Several variables, both quantitative and qualitative, are considered and displayed in the following analysis of the affected environment. Information has been collected from many different sources, and it is important to be aware of the assumptions used in both collecting and reporting the data. Not all data are comparable, available at the scales desired, or complete. In the following analysis, data are introduced and assumptions are given to allow the reader to interpret the story told within the context of the data.

Current Conditions

CARIBOU ZONE OF INFLUENCE

The social and economic environment comprises the people surrounding the Caribou National Forest, and includes the lifestyles and attitudes of people toward use and access of Forest resources. The analysis area for the Caribou Forest Plan revision includes eight counties in Idaho (Bannock, Bear Lake, Bingham, Bonneville, Caribou, Franklin, Oneida, and Power) and Lincoln County in Wyoming. Much of the county profile information is condensed from the study entitled Socioeconomic Overview of the Caribou National Forests (Benson and Stegner, 1995). Because States collect demographic and economic information differently, comparisons between all counties within the analysis area can be difficult. Throughout the analysis, differences between datasets will be highlighted and explained where necessary. Each county is described below in terms of social and economic trends as well as the level of interest and issues counties have concerning the Caribou Forest Plan revision process. Following these general descriptions, regional social and economic information will be highlighted and compared. This information provides a basis for context and comparison for decision makers.

BANNOCK COUNTY

Bannock County, particularly Pocatello, is considered the center of the Idaho counties within the study area. Bannock is one of the more urban (83 percent) counties in the analysis area. The county serves as a health services, retail, financial, and commercial hub for southeastern Idaho. Its role as a retail and financial center have diminished somewhat as Bonneville County to the north (Idaho Falls), Twin Falls to the west, and Salt Lake City to the south have begun to capture some of the retail trade. Major employment in the county includes Idaho State University, Bannock Regional Medical center, phosphate processing plants, light technology production, transportation, and food production. Non-labor income, including retirement, disability payments, Medicare, dividends, and rents has increased to 30 percent of the county's total personal income in 1999 from 21 percent in 1970.

The relationship of the Forest and its management with the citizens of Bannock County is one of providing recreational opportunities, clean water and air, and forage production, particularly adjacent to Pocatello. The forest provides a variety of recreation opportunities and access, both motorized and non-motorized, in summer and winter. The Forest also provides phosphate rock for the above-mentioned processing facilities. Water from the Forest is used for domestic, municipal, and irrigation purposes. Within the Forest, the Pocatello watershed is a congressionally designated watershed. The majority of the Forest land base within Bannock County is used for grazing domestic livestock.

Bear Lake County

Bear Lake County is the most southeast county in Idaho, bordering both Utah and Wyoming. The largest city is Montpelier. Other small communities in the county include Bloomington, Georgetown, Paris--the county seat--and St. Charles. Major employment in the county is found in wood products, light manufacturing, and agriculture. Many county residents travel to bordering counties for employment opportunities. Recent employment trends show increases in construction, trade, and services as the county has been experiencing rapid development in subdivisions and seasonal housing, especially surrounding Bear Lake with its inviting scenery, boating, and fishing opportunities. The area appears to be attractive to retirees; non-labor income has increased to almost 39 percent of total personal income in 1999 for the county compared to 17 percent in 1970. While this source of income into the county can be beneficial to local economic conditions, the growth and development also creates local concern for cultural and economic change in communities as newcomers arrive.

The rapid development in the Bear Lake area is a major driver in the county's current efforts to revise their county planning documents (Rine, 2001). The county is also a member of the Bear Lake Regional Commission, an organization of Idaho and Utah government and private entities that cooperate on mutual concerns, such as local rapid development.

The Forest provides dispersed and developed recreation sites that are heavily used by local and non-resident visitors, primarily from Utah. Minnetonka Cave and St. Charles Canyon on the Forest offer scenic and educational opportunities that draw visitors the area during the summer months. Well-developed and less crowded snowmobile trails bring winter recreationists to the area. In addition to recreation and tourism opportunities, some wood supply for the mill, as well as firewood, is supplied through activities on the Forest.

Bingham County

Although no Forest system land in located within Bingham County, its proximity to the Forest places it within the analysis area. Communities in the county include Shelley, Aberdeen, Atomic City, Basalt and Firth. Part of the Fort Hall Indian Reservation is also located within the county. Major employment in the county is found in agriculture, wood production, food processing, education, and health services.

Major employers are Nonpareil, Pillsbury, Basic American Foods, J. R. Simplot (food processing), State Hospital South, Bingham Memorial Hospital, and the school district. Many residents travel north to Bonneville County to the Idaho National Engineering and Environmental Lab for employment. Non-labor income was 32 percent of total personal income in 1999, a significant increase from 1970 when non-labor income was only 17 percent of total personal income.

Tribal concerns related to Forest management include continued recognition of tribal treaty rights, particularly in the ceded lands outside of Pocatello. One specific concern is cumulative impacts of travel management as winter travel on National Forest System lands allows general access onto the Reservation. Bingham county residents recreate on both the

Caribou and Targhee National Forests and are interested in management that may influence their current use patterns.

BONNEVILLE COUNTY

Bonneville is the northernmost county in the Forest's zone of influence. The county lies in the Snake River plain and continues east to the Wyoming border. The county's population is almost 80 percent urban, with a large portion of people living in and around Idaho Falls. Other small communities including Ammon, Iona, Ucon, Irwin, Ririe, and Swan Valley, make up the remainder of population centers. More than half the land area in the county is under government ownership.

The economy has diversified in recent years, but it is still dominated by the Idaho National Engineering and Environmental Laboratory (INEEL). Other major employers include the Department of Energy, Columbia Eastern Idaho Regional Medical Center, WalMart, Albertsons, and the school district. Non-labor income within the county accounted for 31 percent of total personal income in 1999, a significant increase from 18 percent in 1970.

Residents of Bonneville County participate in a number of recreational pursuits on the Caribou and the Targhee National Forests. The South Fork of the Snake River is regionally and nationally renowned for its fly-fishing. Palisades Reservoir, on the South Fork, Ririe Reservoir, and Grays Lake are among the county's most popular attractions.

CARIBOU COUNTY

Caribou County lies between Bannock on the west, Wyoming on the east, Bingham and Bonneville counties to the north, and Bear Lake and Franklin counties to the south. Communities include Bancroft, Grace and Soda Springs. About 50 percent of the county's land base is in private ownership, 40 percent is owned and managed by federal agencies, and 10 percent by the State and county.

Major employment opportunities are found in phosphate mining, food processing, state and local government, education, and health care. The county supports a small, but stable agricultural sector. Major employers include Monsanto, Agrium/Nu west Phosphate, Conda Mining, Astaris, Dravo Corporation, Grace School District, Soda Springs School District, Mark III, Inc., Caribou Memorial Hospital and Nursing Home, J.R. Simplot, and Heritage Safe Company. Similar to other counties in the analysis area, non-labor income has increased as a portion of total personal income to 33 percent in 1999 compared to only 15 percent in 1970.

With significant employment in phosphate mining, the county is interested in forest management and access to the phosphate beds within National Forest System lands. The Forest also offers some commercial timber, domestic livestock grazing, and recreational opportunities to Caribou County residents.

Franklin County

Franklin County borders Utah on the south, Bear Lake County on the east, Oneida County on the west, and Caribou County to the north. Preston is the largest city and the county seat. . Clifton, Dayton, Franklin, Oxford, and Weston are other small communities within the county. Sixty-four percent of county land is in private ownership, 33 percent is federally managed, and three percent is owned by the State of Idaho.

Major employment opportunities are found in agriculture, manufacturing, education, and health care. Major employers are Ritewood, Pacificorp, the City of Preston, West Side School District, the Franklin Medical Center and Nyloplast, Inc. Given the proximity of larger cities outside Franklin County, trade and services are not as developed as the population of the county would suggest (Benson and Stegner, 1995). Non-labor income within the county accounts for 31 percent of total personal income, increasing almost 10 percent between 1970 and 1999.

Franklin County is one of only two counties in the Greater Yellowstone Area that is reliant primarily on agriculture (Greater Yellowstone Coalition, 2001).

Recreation opportunities include four groomed snowmachine trials on the Forest, drawing out-of-state visitors to the area – primarily from Utah – as well as a variety of general recreational opportunities. In terms of wildlife, the Forest provides upland game bird and big game hunting opportunities. Commercially, the Forest provides some local operations with grazing and timber, fuelwood, and special forest products harvesting opportunities.

Oneida County

Oneida County is bordered to the south by Utah, Franklin County to the east, Cassia County to the west, and Bannock and Power Counties to the north. Over half of the county's population resides within Malad City. The county land base is comprised of 53 percent federal land, 2 percent State land, and the remaining 45 percent is privately owned.

Major employment opportunities include agriculture, pumice mining, and education. A recent trend in increased property values and residential building in Malad City has been created by Utahans who work in Ogden and other northern Utah communities and are willing to reside in Malad City and commute to these larger metropolitan areas. Non-labor income is a large portion of the County's total personal income – 40 percent in 1999 – an increase of 15 percent since 1970. This large portion of non-labor income highlights another trend within the county of retirees moving into the area, bringing their retirement income with them.

Portions of the Caribou National Forest and The Curlew National Grassland located in Oneida County are primarily used for grazing domestic livestock for local operations. The Forest provides upland game bird and big game hunting and a variety of recreational opportunities.

POWER COUNTY

Power County is home to the American Falls Reservoir – an important regional attraction and supply of water for agriculture irrigation and power generation. Communities include American Falls and Rockland, as well as a population linked to Pocatello subdivisions. Private ownership accounts for 63 percent of county land, federal ownership is about 33 percent with the State and county owning about 4 percent.
Major employment opportunities within the county are within the agriculture, phosphate and food processing, trade and services, and state and local government. Major employers include Lamb-Weston, J.R. Simplot, Driscoll Potatoes, Double L Manufacturing, Harms Memorial Hospital, Kase Industrial, Inc., and the school districts. About 29 percent of the county's total 1999 personal income is attributed to non-labor income sources. While this percent of non-labor income has almost doubled since 1970, Power County has one of the lower rates of non-labor income in the analysis area.

Local use of the Forest includes grazing and recreation, as well as phosphate processing operations that rely on phosphate supplies from the Forest for their production.

LINCOLN COUNTY

Lincoln County's landscape varies significantly from forested mountains in the north to open plains in the south. Federal land ownership within the county includes management of four different National Forests. The Caribou National Forest manages only a small portion of land within Lincoln County.

The agriculture, mining/oil and gas sectors offer the majority of the area's employment opportunities. The county's largest employers are Exxon Shute Creek Gasification Plant, Lincoln County School District, J.R. Simplot, FMC Skull Point Mine, Astaris Coke Plant, Pittsburgh & Midway Coal Mining Company, Pacific Corporation's Naughton Plant, and the Williams Field Service Opal Plant. While the county has a great deal of manufacturing and mining/drilling occurring, non-labor income accounted for 43 percent of total personal income; in 1970 non-labor income was 20 percent of total personal income. Wyoming is often an attractive place for retirees due to the lower property values and no income taxes. Many people are moving into Lincoln County, because they are not able to afford the high cost of living and housing in Teton County, Wyoming to the north.

Local use of the Forest provides a variety of recreation activities. The J.R. Simplot Smokey Canyon phosphate mine, which is a major employer in Star Valley, is on the Forest in Idaho. Lincoln County receives significant payments from the government based on mineral and oil/gas extraction. The Caribou NF plays a minor role in these payments.

THE SHOSHONE BANNOCK TRIBE

Traditional socio-economic paradigms are inoperative in considering the culture of the Shoshone Bannock Tribe. In fact, the word culture is self-limiting. What the tribe has, in fact,

is not simply culture, in the Anglo sense; it is a *lifeway* neither bound by nature nor limited by time.

The Shoshone Bannock People do not differentiate environmental and cultural resources. To the Tribe, the ecosystem is the cultural resource. This goes beyond the Tribe's belief that they are responsible for natural resources. Tribal people consider themselves related to resources. According to Shoshone Bannock Archaeologist, Diana Yupe, Tribal People are responsible to the past, present, and future because they have not divorced themselves from the part of their being that is the natural environment; according to Ms. Yupe, they cannot; they do not have a choice.

The concept of *continuity* brings together more traditional concepts of cultural and natural resources to better portray Shoshone Bannock beliefs. The signature culture left by their ancestors identifies who the Tribe was in the past and who they are now. They practice the same culture on the same land: the Shoshone Bannock Tribe hunts in the same places and practices the same culture represented in old cultural resource sites. Such cultural resources enable the Tribe to continue its lifeway from the past into the present. The future, according to Ms. Yupe, remains to be seen. But proper management of cultural resource sites and natural resources is clearly critical, and the Tribe is keenly interested in documented discussion in the Forest Plan about treaty rights and cultural resource laws.

The Shoshone Bannock Tribe expects partnership in management of resources, both cultural and environmental. They expect to be involved as provided for in law and Executive Order. To the Tribe, proper management of cultural resources means management of the environment through proper methodologies that restore and protect native species, both plant and animal. Recently, the Tribe worked with the BLM to establish guidelines for grazing and watershed protection and restoration. They would like, if not expect, to be involved in similar efforts with the Forest Service from a perspective that is uniquely Native American:

> *"Thousands of years ago, our ancestors made a commitment to the natural resources. We are the voice for those who cannot speak: wildlife, plants, soil and rocks, native species. We can hear them, and we can talk for them"* (Yupe, 2001).

The Tribe seeks assurance from land managers that the Plan will meet environmental laws that were set down without Tribal input. They want the Plan to ensure Tribal sites are not destroyed or lost. When cultural resource sites are removed from the natural environment to record data, the Tribe no longer has the site and cultural continuity is lost. The Tribe is especially concerned that the Forest Service conducts proper cultural resource surveys of project sites. "What we are doing on our land is our business. What you are doing on your land is our business too" (Yupe, 2001).

Federal Tribal Trust Responsibilities and Treaty Rights are described in Chapter 1.

LAND OWNERSHIP

On average, the counties in the analysis area have about forty-one percent of their lands within farmland use and forty-one percent in federal ownership (including Forest Service, BLM, U. S. Fish and Wildlife Service, Bureau of Reclamation, and Department of Defense). The largest portions of the Forest are within Bonneville and Caribou Counties. The smallest portions, all less than one percent of county lands are within Lincoln County, Wyoming and Franklin County, Idaho. Those counties with large portions of Caribou NF lands are likely to be the most directly impacted through potential changes in use and access, as well as funding through federal payments to states and counties in lieu of taxes.

DEMOGRAPHICS

Most of the analysis area counties are sparsely populated but, with the exception of Bear Lake, Caribou and Lincoln counties, have grown at rates at or above the area average of nine percent during the 1990s. Table 3.4 displays population trends from 1992 – 2001 and percent change over the 10-year period of the analysis area counties and States for comparison. The ten-year growth rate at the national level is nine percent; Idaho has a significantly higher growth of 24 percent, while Wyoming is slightly below the national average at 7 percent. The analysis area counties on average saw 9 percent growth in population over the ten-year time period. Those counties showing significantly higher growth border urban areas around the Wasatch front. These counties are experiencing development and growth as people move into the area and commute to jobs in Salt Lake City, Ogden, and other large communities.

Table 3. 4 Population for Analysis Area and States, 1992-2001.

(Source: U.S. Census Bureau, American Fact Finder Website, 2002.)

Area	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	% Change 92-01
Bannock	68,981	70,484	72,083	73,110	73,431	73,941	74,272	74,881	75,536	75,323	9%
Bear Lake	6,283	6,364	6,392	6,564	6,503	6,533	6,511	6,561	6,413	6,345	1%
Bingham	39,618	40,348	40,848	40,928	41,185	41,457	41,825	42,127	41,815	42,335	7%
Bonneville	77,104	78,251	79,118	79,429	79,362	80,021	80,699	81,536	82,859	83,807	9%
Caribou	7,120	7,247	7,229	7,290	7,371	7,286	7,403	7,273	7,312	7,397	4%
Franklin	9,519	9,808	10,099	10,230	10,528	10,828	11,113	11,350	11,370	11,590	22%
Oneida	3,494	3,520	3,627	3,829	3,878	3,997	4,030	4,062	4,126	4,210	20%
Power	7,530	7,732	7,998	8,111	8,162	8,224	8,412	8,404	7,515	7,468	-1%
Lincoln, WY	13,042	13,211	13,600	13,873	13,967	13,830	13,809	13,998	14,630	14,793	13%
Analysis Area	**232,691**	**236,965**	**240,994**	**243,364**	**244,387**	**246,117**	**248,074**	**250,192**	**251,576**	**253,268**	**9%**
Idaho	1,066,490	1,101,204	1,135,459	1,165,000	1,187,706	1,210,638	1,230,923	1,251,700	1,299,258	1,321,006	24%
Utah	1,821,498	1,875,993	1,930,436	1,976,774	2,022,253	2,065,397	2,100,562	2,129,836	2,241,555	2,269,789	25%
Wyoming	463,491	469,033	474,982	478,447	480,085	480,031	480,045	479,602	494,001	494,423	7%

As is common in counties throughout the rural west, county populations are not as racially diverse as the general population of the United States. Table 3.5 highlights the racial characteristics for comparison of the analysis area. All counties make up very little of the total population of their State total. This highlights the rural and small population surrounding the Caribou Forest. The diversity in race is also limited in the two States described and most analysis area counties. A few exceptions are seen in Power County with a Hispanic population greater than the United States and Idaho average. The Fort Hall Reservation located within Bannock, Bingham, and Power counties increases the American Indian population of the three counties.

Table 3.6, below, highlights additional demographics of the analysis area. The median ages of county residents in the analysis area are similar to the states and national median ages. 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 Bear Lake, Caribou, Oneida, and Lincoln counties all attract part-time residents to the area. In general, the analysis area population has not pursued advanced degrees as often as the state and national averages, but the poverty level is lower in most counties.

Table 3. 5 Population Characteristics Compared for the United States, Idaho, Utah, Wyoming and Caribou Analysis Area in 2000.

(Source: US Census Bureau, American Fact Finder Website, 2002.)

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					
Bannock	75,565	5.8%	91.3%	0.6%	2.9%	1.2%	4.1%	4.7%
Bear Lake	6,411	0.5%	97.7%	0.1%	0.5%	0.1%	1.6%	2.4%
Bingham	41,735	3.2%	82.4%	0.2%	6.7%	0.6%	10.1%	13.3%
Bonneville	82,522	6.4%	92.8%	0.5%	0.6%	0.9%	5.2%	6.9%
Caribou	7,304	0.6%	96.1%	0.1%	0.2%	0.2%	3.3%	4.0%
Franklin	11,329	0.9%	95.1%	0.1%	0.3%	0.1%	4.3%	5.2%
Oneida	4,125	0.3%	97.5%	0.1%	0.3%	0.2%	1.9%	2.3%
Power	7,538	0.6%	83.8%	0.1%	3.3%	0.3%	12.5%	21.7%
Lincoln, WY	14,573	3.0%	97.1%	0.1%	0.6%	0.3%	1.9%	2.2%
Idaho	1,293,953	NA	91.0%	0.4%	1.4%	1.0%	6.2%	7.9%
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%

NA = not available.

Total percentages for each county may add to more than 100 percent as people can select more than one race.

Table 3. 6 Demographic Characteristics Compared for the United States, Idaho, Wyoming, and Analysis Area in 1989 and 2000.

(Source: US Census Bureau, 2000 Census. American Fact Finder Website, 2002 and *US Census Bureau, 1990 Census. American Fact Finder Website, 2002.)*

Area	Average Family Size	Median Age	Population 65 and Over	High School Graduate or More	College Graduate or More	Poverty Level, 1989*	Second or Vacation Homes
	People	Years	Percent	Percent of Population 25 and Older		Percent	Percent of Total
Bannock	3.20	29.8	8.8%	82.9%	19.8%	1.0%	0.9%
Bear Lake	3.33	35.8	14.3%	79.8%	11.4%	1.0%	22.3%
Bingham	3.52	29.7	9.0%	76.8%	13.1%	3.5%	0.7%
Bonneville	3.33	31.8	7.9%	84.0%	23.2%	1.3%	1.2%
Caribou	3.29	35.0	11.1%	84.3%	11.8%	0.7%	8.1%
Franklin	3.64	27.7	11.3%	82.2%	14.3%	0.4%	4.3%
Oneida	3.35	36.0	15.0%	78.7%	12.9%	0.1%	6.5%
Power	3.38	31.6	9.6%	72.1%	11.1%	3.1%	1.0%
Lincoln Co., WY	3.23	36.8	8.7%	83.2%	15.2%	0.2%	13.4%
Idaho	3.17	33.2	5.0%	86.2%	20.0%	1.5%	5.2%
Wyoming	3.00	36.2	5.1%	90.0%	20.6%	1.2%	5.5%
U.S.	3.14	35.3	5.1%	84.1%	25.6%	2.2%	3.1%

*2000 poverty statistics not available at this time.

EMPLOYMENT

With population changes and growth, employment within the analysis area has also been changing. Figure 3.3 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.

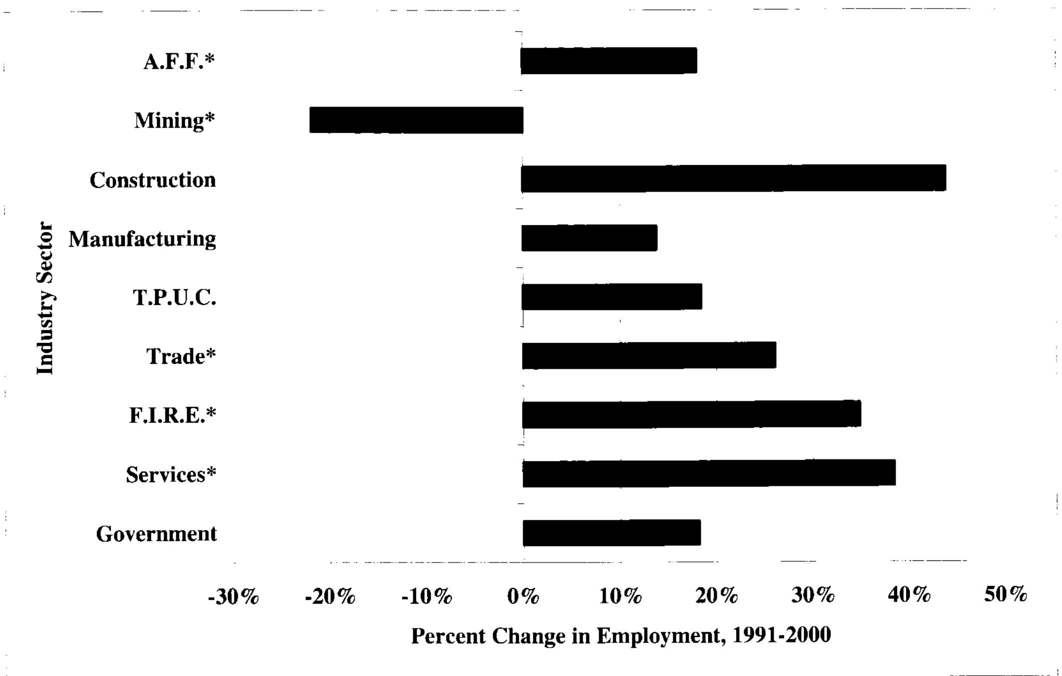
Construction is the largest growth sector in the analysis area and has increased in all counties included in the analysis area. Associated with increasing population and overall growth of the area, residential and commercial buildings are being constructed, as well as infrastructure required to accommodate 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 ten 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. Franklin and Bear Lake counties saw large increases in F.I.R.E. likely associated with second home construction and sales.

The majority of government employment increases throughout the study area occurred within state and local education. In several of the analysis area counties, education is one of the largest employers in the area.

Figure 3. 3. Employment Change by Major Industry Between 1991 and 2000.

(Source: REIS, 2002.)



* Figures were estimated for Bannock, Bear Lake, Bingham, Franklin, Oneida, and Power Counties due to disclosure regulations of employment and income data.

Sectors defined according to Standard Industry Classification Manual, 1987:

1. **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.
2. **Mining** includes the extraction of minerals occurring naturally, quarrying, well operations, milling, preparation at the mine site, and exploration and development of mineral properties.
3. **Construction** includes new work, additions, alterations, reconstruction, installations, and repairs of structures.
4. **Manufacturing** includes the processing of materials (products of agriculture, forestry, fishing, mining, and quarrying) into new products. Examples include food, textiles, phosphate processing, lumber, wood products, furniture, paper, machinery, and appliances.
5. **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.
6. **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.
7. **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.
8. **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.
9. **Government** includes all Federal, state, and local government employees involved in executive, legislative, judicial, administrative and regulatory activities.

Manufacturing includes logging, sawmills, and phosphate processing which are associated with outputs from the Caribou National Forest. Food processing and other production is also

accounted for within this sector. All counties in the analysis area show some increases, except for Power County with a manufacturing employment decline of 10 percent.

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 only sector to show an employment decline within the analysis area is mining. This is reflective of changes within operations in Caribou County and Lincoln County between 1991 and 2000. Caribou County's phosphate mining employment declined between 1991 and 2000 from 540 to 410 due to changes in mining operations. Future changes may be expected as all phosphate mines in the County are currently applying for permits to expand or continue existing operations. Phosphate processing is not reflected in this, since it is under manufacturing. Lincoln County's employment in coal mining and oil and gas drilling declined between 1991 and 2000 from 690 to 515. These changes are likely due to larger market forces impacting the industry; future demands for energy will continue to cause fluctuations in this industry.

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 3.4 highlights the percent change of total personal income by major sectors between 1991 and 2000 for the analysis area in 2000 dollars.

All dollars in Figure 3.4 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 agriculture, forestry and fishing sector had the largest increase between 1991 and 2000. This sector fluctuates year-to-year depending on various market conditions and prices, so often trend analysis over short periods are difficult, depending on whether the beginning and end points were up or down years for the industry. In the case of this ten-year period, the analysis also includes a trend from many small farms toward a few, larger corporate

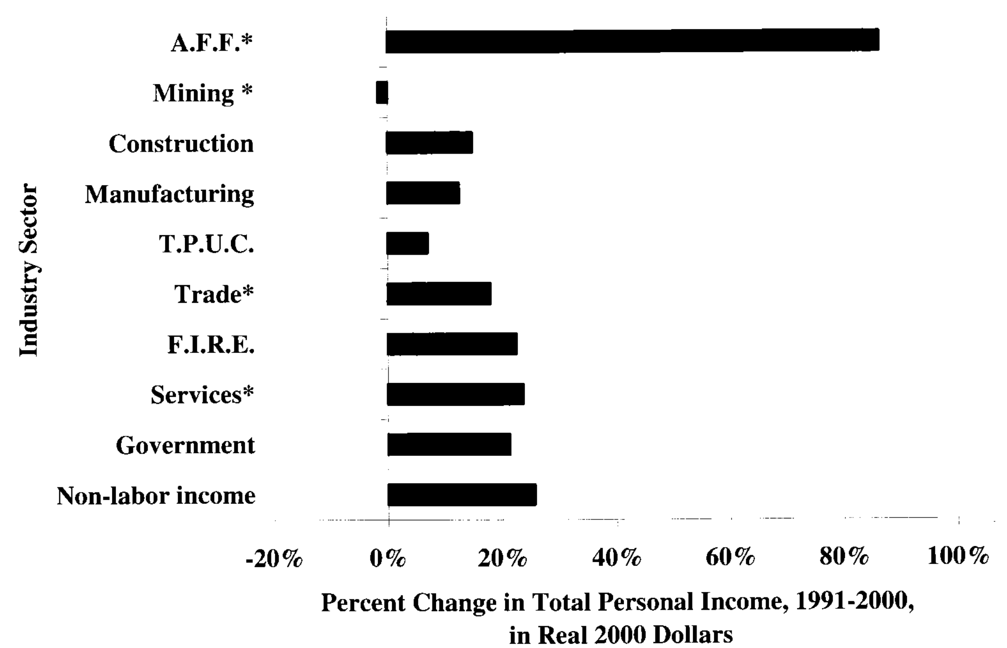
operations. Bonneville and Franklin counties had the largest increases of the individual counties in the analysis area.

Mining, similar to the employment analysis, is the only sector to show a decline in income between 1991 and 2000. This decline is concentrated in Caribou and Lincoln counties and associated with changes in phosphate mining and market changes in coal, oil and gas.

The remaining sectors show some growth, 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, services, and construction jobs.

Figure 3. 4 Total Personal Income Change in Real 2000 Dollars Between 1991 and 2000 by Major Sector for the Analysis Area.

(Source: REIS, 2002.)



* Figures were estimated for Bannock, Bear Lake, Bingham, Franklin, Oneida, and Power Counties due to disclosure regulations of employment and income data.

PER CAPITA INCOME

Annual *per capita* personal income (PCPI) in Idaho in 2000 was $23,727 compared to $29,469 nationally. Table 3.7 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. In 2000, all counties in the analysis area experienced below average annual growth rates for PCPI comparable to the national average. Bonneville County's *per capita* personal income was the highest in the analysis area,

possibly because of the higher pay scale in the Idaho National Engineering and Environmental Laboratory, an important employer in the county.

Table 3. 7 Per Capita Personal Income and Percent Change for the Analysis Area, 2000.

(Source: REIS, 2002.)

Area	2000 *per capita* Personal Income	1990-2000 Change	1999-2000 Change
	Dollars	Percent	
Bannock	$21,141	4.1%	4.9%
Bear Lake	$16,602	4.3%	2.5%
Bingham	$19,079	3.0%	7.4%
Bonneville	$23,603	3.2%	4.5%
Caribou	$20,712	3.7%	3.0%
Franklin	$15,996	3.7%	1.4%
Oneida	$15,176	2.6%	1.3%
Power	$21,782	1.9%	9.4%
Lincoln	$20,980	3.8%	1.8%
Idaho	$23,727	4.1%	6.1%
Wyoming	$27,372	4.3%	5.3%
United States	$29,469	4.2%	5.8%

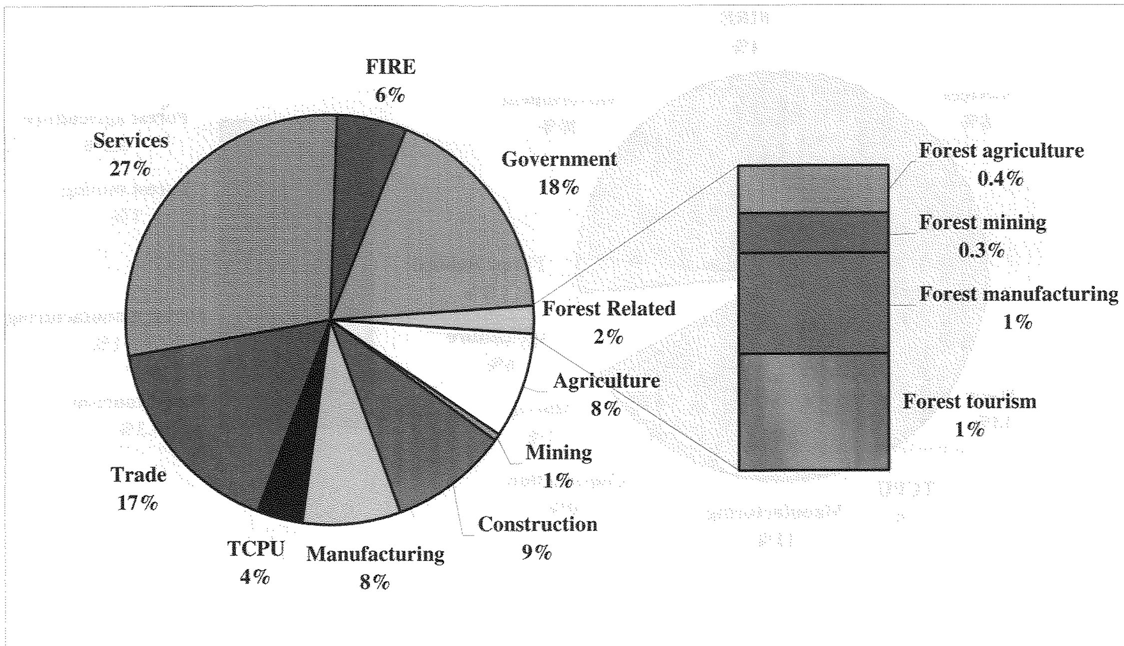
FOREST RESOURCE RELATED INDUSTRIES AND RESOURCES

This section focuses on the four 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 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 are from IMPLAN Pro models (MIG 2000). The data allow for the separation of specific sectors and include detailed information not available from other state or federal data sources. The trade-off is that the latest data available are for 1999. Other sources of 2000 data are available and were used in earlier descriptions of the economic conditions. Figure 3.5 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), phosphate mining (Forest mining), wood products (logging and sawmill), phosphate processing (Forest manufacturing), and visitor industry activities that are supported by Caribou NF resources or outputs (Forest tourism). For more information, individual sectors selected to represent each industry see Appendix B.

Figure 3. 5 Estimated Forest Service-related Employment Contributions within the Analysis Area, 1999.

(Source: IMPLAN Pro, 2002.)

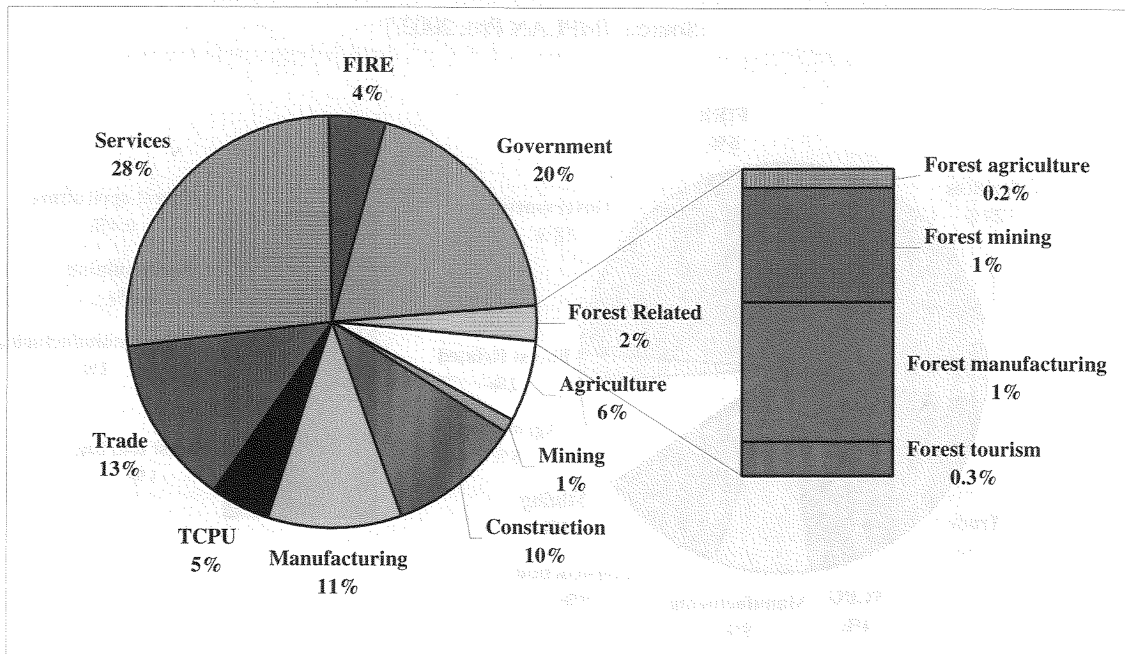


Within the analysis area, the employment directly related to Caribou National Forest activity is estimated at only two percent. The majority of forest-related employment is within phosphate processing and tourism-related activities. It is difficult to estimate all impacts specifically related to Forest management; this analysis is likely a conservative estimate of employment. Those counties with infrastructure for processing forest outputs are more likely to be impacted by changes in management and have specific interests in Caribou Forest management: Caribou and Bannock counties in Idaho and Lincoln County in Wyoming with phosphate mining and processing facilities; Bear Lake County with logging and sawmill operations; and counties with developed tourism opportunities.

Figure 3.6 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 Caribou NF, Forest-related outputs account for about two 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 visitor 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 3. 6. Estimated Forest Service-related Labor Income Contributions within the Analysis Area, 1999.

(Source: IMPLAN Pro, 2002.)

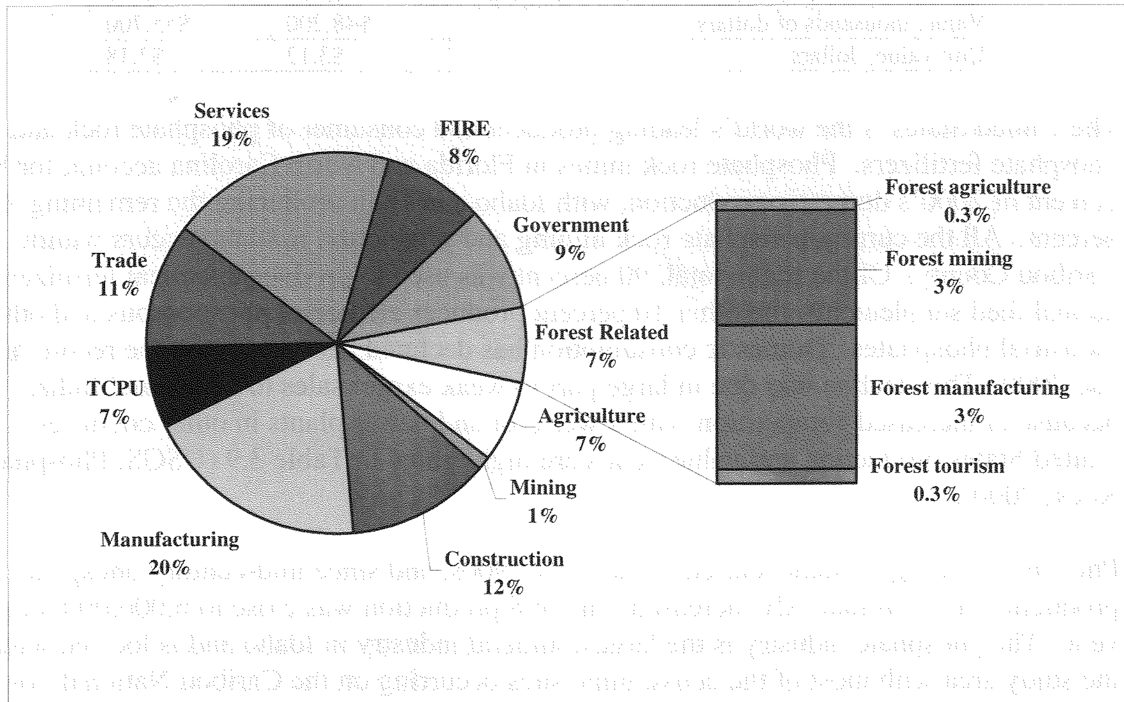


As a final comparison, the 1999 industry output by sector is presented in Figure 3.7 to highlight the contribution of the Forest-related industries within the analysis area. Due to the large production in phosphate mining, the forest related portion is seven percent of total output. Agricultural outputs associated with grazing on the Caribou National Forest are also significant considering the portion of employment and income associated with the same activity. While tourism does not appear to generate a great deal of output, much of the trade and services generated in the analysis area by people visiting the Forest may not be measured in this analysis due to difficulties in gathering specific data for tourism expenditures.

The following analysis describes some historical trends and current situation of the four forest resource-related industries within the analysis area.

Figure 3. 7 Estimated Forest Service-related Industry Output Contributions within the Analysis Area, 1999.

(Source: IMPLAN Pro, 2002.)



MINERALS

Idaho

Phosphate rock, silver, construction sand and gravel, molybdenum, and lead ore, by value, are Idaho's leading non-fuel minerals. Idaho remains the only state to produce antimony ore, used as a hardening alloy for lead. Low metal prices in 2000, uncertainty related to the Forest Service roadless rule and the new BLM 3809 rules and regulations addressing mining access, mine management, and bond issues contributed to many producing mines in Idaho losing money or laying off staff. In 2000, Idaho also saw the closure of the State's remaining large gold mine, the Meridan Gold Company's Beartrack Mine in Lemhi County, and Sunshine silver mine in Shoshone County, filing for bankruptcy. Despite these recent trends, a high demand for industrial minerals and construction materials has contributed to and increases in exploration activity for several commodities and several mine expansion and improvement projects (USGS, Mineral Industry of Idaho, 2000).

Within Idaho, there were 137 active construction sand and gravel operations and processing plants. Compared to 1999, both the volume and value of construction sand and gravel increased in 2000 as highlighted in Table 3.8.

Table 3. 8 Construction Sand and Gravel Sold or Used by Producers in Idaho, 1999 and 2000.

(Source: USGS, Sand and Gravel, Construction, 2000.)

Construction Sand and Gravel	1999	2000
Sold or used in Idaho, thousands of metric tons	15,500	17,500
Value, thousands of dollars	$48,200	$55,700
Unit value, dollars	$3.12	$3.18

The United States is the world's leading producer and consumer of phosphate rock and phosphate fertilizers. Phosphate rock mines in Florida and North Carolina account for 86 percent of 2000's domestic production, with Idaho and Utah producing the remaining 14 percent. All the current phosphate rock mining and production in Idaho occurs within Caribou County. Of the Idaho total, 90 percent was used to produce chemical fertilizers and animal feed supplements, the other 10 percent produces elemental phosphorous and other industrial phosphates. Domestic consumption has declined between 1999, the record high, and 2000. This decline was due in large part to weak export sales to China and India, because of increased competition with lower cost and newer plants in other countries. United States production and value trends are highlighted in Table 3.9 (USGS, Phosphate Rock, 2000).

Phosphate mining in Idaho started in the early 1900s, and since mid-century phosphate production has continuously increased. In 1998 production was close to 6,000,000 tons per year. The phosphate industry is the largest mineral industry in Idaho and is located within the study area with most of the active mine sites occurring on the Caribou National Forest. Four major companies are actively mining; these are listed in Table 3.10. All were working on permits and development activities for new mines or expansions of existing operations in 2000. Together, the four mines extracted 5.4 million metric tons of ore in 2000. Three processing plants also are located in southeast Idaho, one near Pocatello and two near Soda Springs. The only elemental phosphorous (P4) producing plant in North America is located in southeastern Idaho. About 65 percent of the elemental phosphorous produced is used in manufacturing detergents, food additives, soft drinks, and raw materials to make calcium, potassium, and sodium phosphates. The other 35 percent is used to make herbicides, insecticides, flame-retardants, lubricating greases, and plasticizers (USGS, Phosphate Rock, 2000).

Table 3. 9 Salient Phosphate Rock Statistics, United States 1996-2000.

(Source: U.S.G.S, 2000. Phosphate Rock.)

	1996	1997	1998	1999	2000
	Thousands of Metric Tons				
Mine production (crude ore)	179,000	166,000	170,000	161,000	163,000
Marketable production	45,400	45,900	44,200	40,600	38,600
	Thousands of Dollars				
Value	$1,060,000	$1,080,000	$1,130,000	$1,240,000	$932,000
	Dollars per Metric Ton				
Average value[1]	$23.40	$24.40	$25.56	$30.56	$24.14

1 Average value based on the sold or used values.

Table 3. 10 Active Phosphate Rock Mines Within the Study Area in 2000.

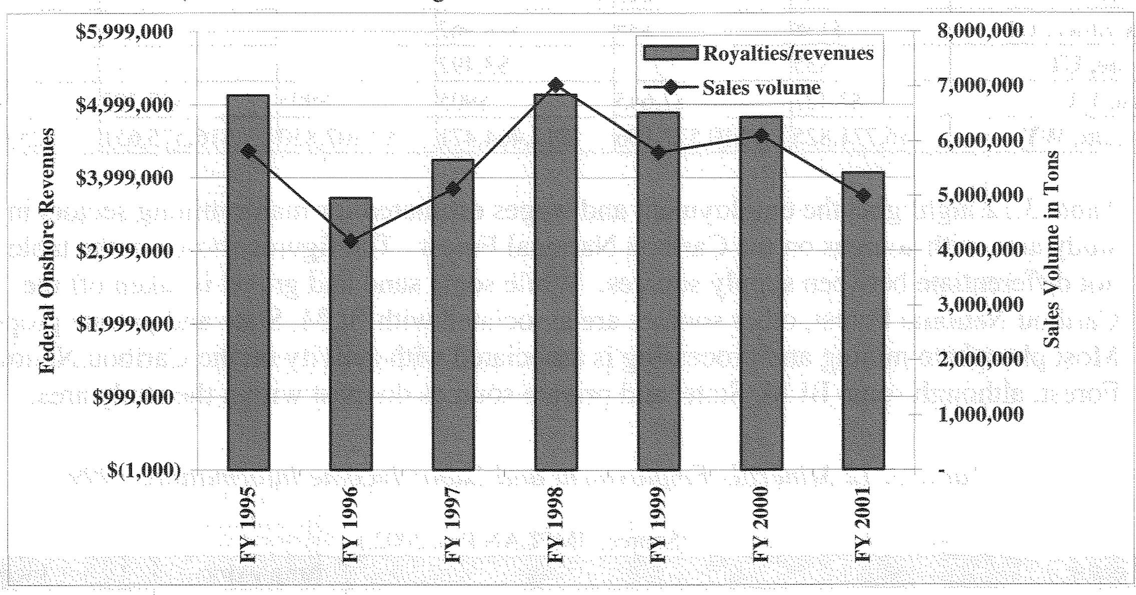
(Source: U.S.G.S, 2000. Phosphate Rock.)

Owner	Mine	County and State
Agrium Inc.	Rasmussen Ridge	Caribou, Idaho
Astaris, L.L.C	Dry Valley	Caribou, Idaho
Monsanto Co.	Enoch Valley	Caribou, Idaho
J.R. Simplot Co.	Smoky Canyon	Caribou, Idaho

Figure 3.8 displays the sales volume of phosphate and leasable mineral production revenues from Federal lands within the state of Idaho. The sale volume includes all phosphate that was sold during the fiscal year, not necessarily the amount mined; it is possible for an operation to mine more material than was sold by stock piling the additional material for later sale. Revenues and royalties are returned to the Federal treasury and are generally based on the total sales value (Mineral Management Service, Federal onshore revenues, 2002).

Figure 3. 8 Phosphate Sales Volume and All Leasable Mineral Production Revenues from Federal Lands in Idaho, Fiscal Years 1995- 2001.

(Source: Mineral Management Service, Federal onshore revenues, 2002.)



Mineral receipts

As mentioned earlier, all phosphate currently being mined in Idaho is located in Caribou County, and most of that is mined on the Caribou National Forest. Through a Federal phosphate lease, mining operations on the Forest are allowed to operate and return a portion of their revenues to the Federal government. Fifty percent of the receipts the Federal government receives are then returned to the state and/or counties where those revenues were generated.

Table 3.11 displays the mineral onshore revenues from Federal lands in the study area counties for the past six fiscal years. These figures include mineral payments for all Federal

agencies, not just the Caribou National Forest. Several counties have limited or no mineral activity occurring. Caribou County has significant payments, based on the flow of phosphate, primarily from the Caribou National Forest. Lincoln County in Wyoming has several oil and gas producing wells and coal mines that bring in significant receipts, but none of these are on the Caribou National Forest.

Table 3. 11 Federal Onshore Mineral Revenues by Counties, Fiscal Years 1996 – 2001.

(Source: USDI, Minerals Management Service, 2002 (www.mms.gov.)

County	FY1996	FY1997	FY1998	FY1999	FY 2000	FY 2001
	Dollars					
Bannock	$2,789	$120	$120	$120	$120	$240
Bear Lake	$7,095	$3,569	$6,177	$5,689	$3,817	$7,621
Bingham	$4,166	$4,127	$4,166	$5,055	$4,086	$5,178
Bonneville	$9,825	- -	- -	- -	- -	- -
Caribou	$2,279,582	$2,324,571	$2,601,525	$2,781,627	$2,484,679	$4,730,866
Franklin	$364	- -	- -	- -	- -	- -
Oneida	$1,714	$7	- -	- -	- -	- -
Power	$144	$15	- -	- -	- -	- -
Box Elder, UT	$138	$35	$19,962	- -	- -	- -
Cache, UT	$35	- -	$3,492	- -	- -	- -
Rich, UT	$3,421	$7,645	$905	$905	$37,203	$25,113
Lincoln, WY	$6,771,825	$10,577,106	$12,464,471	$7,107,830	$16,575,651	$25,635,806

Table 3.12 highlights the employment and wages estimated for major mining sectors in the study area with sources on the Caribou National Forest. The figures shown in the table do not differentiate between supply sources. While some sand and gravel is taken off the Caribou National Forest, other sources are associated with BLM, State and private property. Most phosphate mining and processing is associated with activity on the Caribou National Forest, although some BLM, State, and private sources do exist within the study area.

Table 3. 12 Minerals Employment and Labor Income Information, 1999

(Source: IMPLAN Pro, 2002.)

Sector	Employment	Labor Income
	Annual Average Jobs	Annual Average Dollars
Sand and gravel	35	$50,653
Phosphate	381	$99,132
Nitrogen/phosphate fertilizer and elemental phosphorous production	878	$49,256

RANGE

Local ranchers with grazing permits have an interdependent relationship with the National Forest System. The public lands provide livestock forage for part of the year; with the permittee providing forage for the remainder of the year. Any increase or decrease in grazing opportunities on the Caribou NF may cause adjustments in herd sizes or other factors related to permittees' livestock operations and affect efficient grazing use of their own lands.

The Caribou range program history, trends, and current situation are described in detail under Issue 4: Livestock Grazing later in this FEIS. This section also includes information on current permitted numbers, Animal Unit Months allocated, and other range program information. Forest forage is an important product of the Forest's output to local ranchers. Approximately 95 percent of the 350 Caribou permittees reside in southeast Idaho.

Table 3.13 highlights the employment and wages estimated for range fed cattle, the sector most directly related to the Forest grazing program in the study area. The figures shown in the table do not differentiate between supply sources, but include all operations engaged in range fed cattle within the analysis area. While some of those employed in the sector operate with forage taken off the Caribou National Forest, others are associated with BLM, State or private property. The table is meant to show the general employment and income trend within the industry.

Table 3. 13 Grazing Associated Employment and Labor Income Information, 1999.

(Source: IMPLAN Pro, 2002.)

Sector	Employment	Labor Income
	Annual Average Jobs	**Annual Average Dollars**
Range fed cattle	699	$18,389

WOOD PRODUCTS

The conditions of the U.S. economy and the global economy play a role in U.S. timber production, prices, and market conditions. The U.S. continues to play an important role in the global forest product markets. The U.S. is the largest consumer of paper and paperboard in the world – most of which is supplied domestically or through imports from Canada (U.S. Forest Products Annual Market Review and Prospects, 1999-2002).

While there is still a great demand for wood products, capacity of the softwood lumber industry has seen a lot of change between 1995 and 2001. During this time period, the softwood lumber industry was influenced by the five-year Softwood Lumber Agreement (SLA) between Canada and the U.S. Implemented in April 1996, volumes in excess of 14.7 billion board feet per year were subject to a tariff of $50 for the first 650 million board feet and $100 for amounts beyond that. The SLA regulation raised the cost of lumber $100 per thousand board feet (Profile 2001: Softwood Sawmills in the United States and Canada).

During the first four years of the SLA, a strong economy resulted in robust lumber demands and a continued strong construction market; prices for U.S. products followed the higher costs of Canadian lumber. Such prices increased the profitability of the lumber industry, and many operations invested the additional capital in new plants, expansions, and upgrades. The overall softwood capacity in Canada and America expanded by 13 percent between 1995 and 2000 (Profile 2001: Softwood Sawmills in the United States and Canada).

In 2000, as interest rates began to rise and housing construction began to slow to a level slightly below that of 1999, excess capacity in softwood lumber developed, and prices began a long and sustained fall. By the end of 2000, prices for some lumber species had dropped to

below cost for even the most efficient operations. In addition to excess demand within the U.S., Canadian mills began to ship their maximum allotments under the SLA, fearing that another agreement would replace the current one which would expire in 2001. In the Western U.S. nine mills were permanently closed in 2000 and early 2001 as the industry adjusted to market conditions (Profile 2001: Softwood Sawmills in the United States and Canada).

Along with these national trends, the timber volume supplied by the National Forests has continued to decline. In 1999, total harvest from the National Forest System was 3.3 billion board feet, three percent of the total U.S. timber harvest. This is a 75 percent decrease from the peak National Forest System harvest in 1987 (U.S. Timber Production, Trade, Consumption, and Price Statistics, 1965-1999).

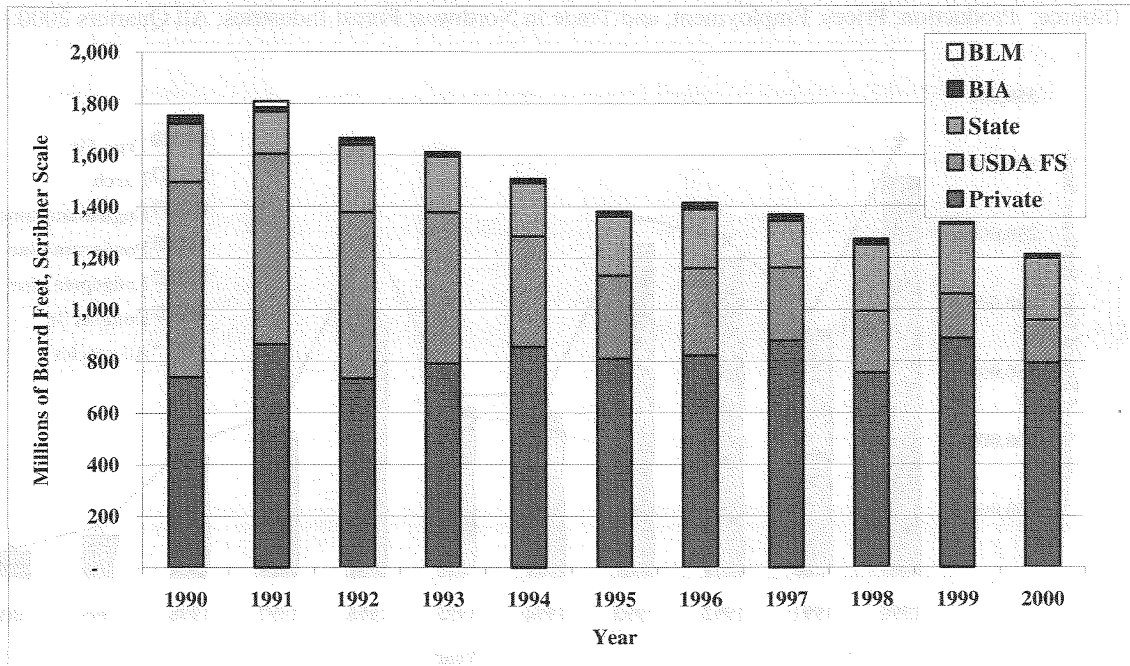
Idaho Wood Products

Timber harvest in Idaho shows a 31 percent total decline since 1990, but it has been relatively stable since 1995. The largest change during this time period has been the decline in National Forest volume; in total a 78 percent decrease. The largest drops came in 1993, 1994 and most recently in 1999. The Forest Service volume accounted for an annual average of 38 percent of Idaho's total harvest between 1990 and 1994, which dropped to an annual average of 19 percent between 1995 and 2000. Between 1990 and 1994 volume from private lands was an average of 48 percent of the state total, and harvest from State lands was an average of 13 percent. Between 1995 and 2000 those averages have increased to 62 percent for private harvest and 18 percent for State land harvest. Timber volumes from both Bureau of Indian Affairs and Bureau of Land Management have been stable throughout the time frame. Both of these land management agencies are fairly small players accounting for one percent and 0.6 percent respectively of the average annual state volume. Figure 3.9 highlights the volume of timber harvested in Idaho by landownership between 1990 and 2000.

Within Idaho there are about 340 forest product plants, seventy-seven of which are lumber mills. Of the total volume harvested in Idaho, 80 percent is shipped within the U.S. to the west, Midwest, and northeast in the form of lumber, plywood, power poles, paper products, veneer, shingles, logs for homes, and other items. Almost 20 percent is purchased as final goods within Idaho, and about 1 percent is exported out of the country, mostly as raw log exports from private lands (Idaho Forest Products website, 2002). Export of logs from Federal lands has been banned for over twenty years, and recently the Idaho State Legislature virtually banned the export of logs from State owned forests with the passage of the Timber Supply Stabilization Act of 1989.

Figure 3. 9 Timber Volume Harvested in Idaho by Land Ownership, 1990-2000.

(Source: Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2000.)

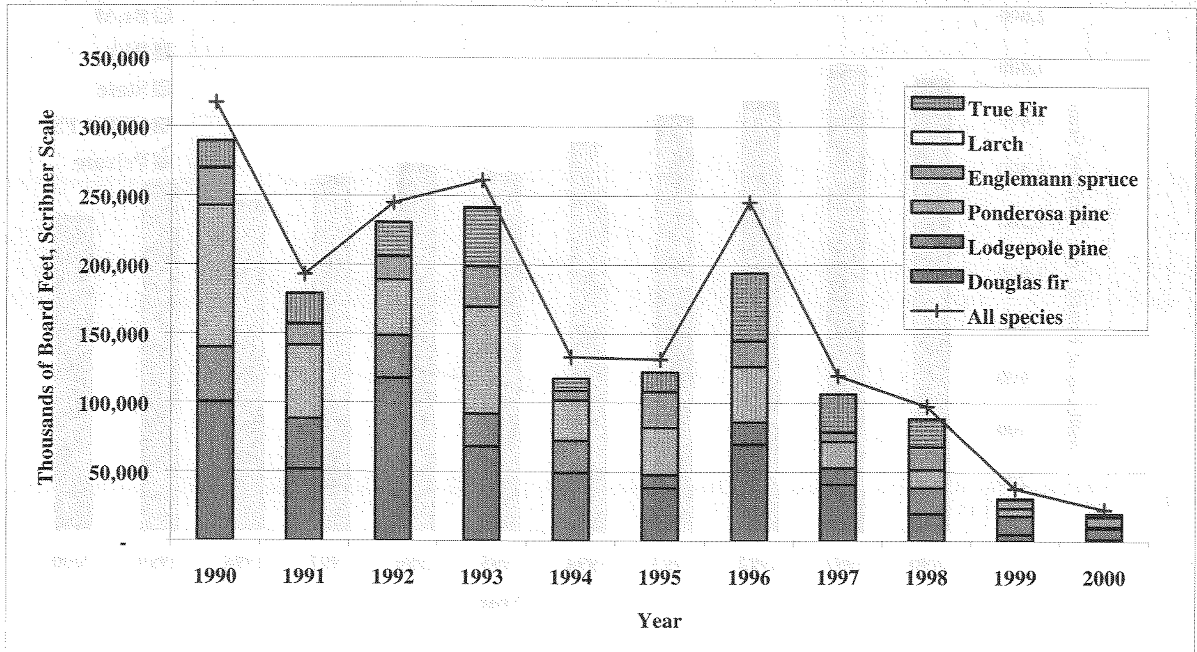


National Forests in Region 4

Figure 3.10 highlights the volume of sawtimber sold from Intermountain National Forests (Southern Idaho, Utah, Nevada, and Northeast California) by major species. The pattern of declining harvest is similar to that in the earlier analysis of all National Forest System volume harvested within the state of Idaho. But within Region 4, the decline has been more erratic, and as of 1997, has declined more significantly. Between 1990 and 2000, the volume of timber harvested in Region 4 declined from 317,270 MBF to 22,691 MBF, or 93 percent. The mix of species harvested has also changed over the time frame. Lodgepole pine was on average 12 percent of the annual harvest 1990-1996, and from 1997-2000 it was almost 20 percent of the annual harvest. Ponderosa pine and Douglas fir made up 23 and 33 percent of the annual harvest respectively. Between 1997 and 2000 those averages dropped to 11 and 13 percent.

Figure 3. 10 Volume of Sawtimber Sold on Region 4 National Forests by Species, 1990-2000.

(Source: Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2000.)



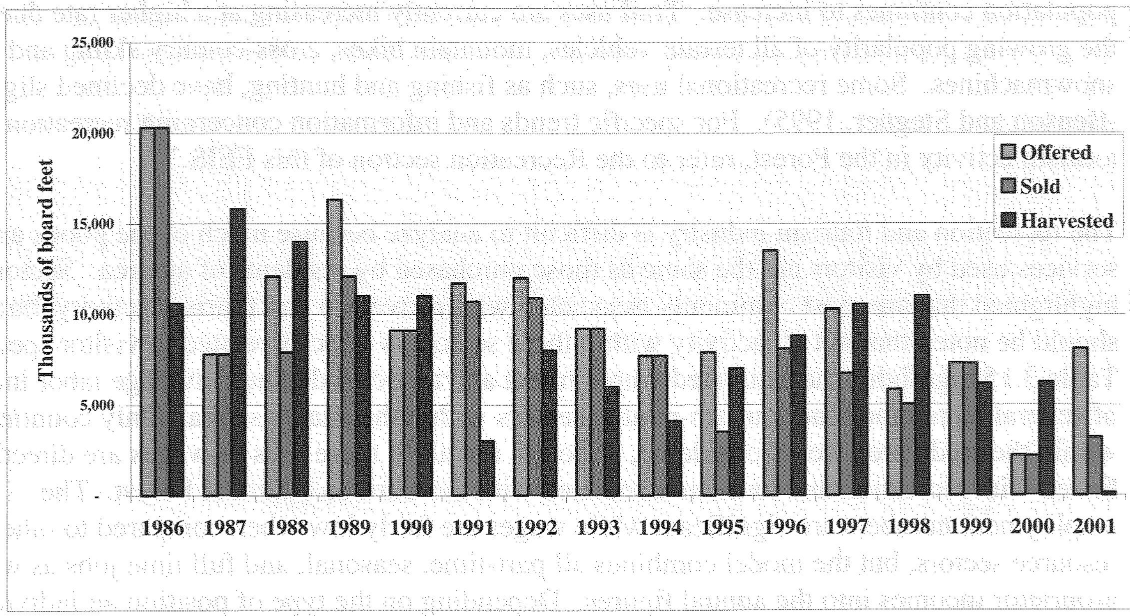
Caribou National Forest

Each year, the Forest Service offers volume for sale to timber operators and depending on each operator's current supply and market conditions, these sales are sold. After a sale is sold, the buyer has up to three years to complete the timber harvesting; so often a sale offered and sold in one year may not be harvested until years later. Figure 3.11 displays the timber volume from the Caribou National Forest that was offered, sold, and harvested each year. These figures include all sawtimber, roundwood, firewood, and other commercial products.

An average sale on the Forest is made up of about 85 percent Douglas-fir and lodgepole pine and 15 percent subalpine fir. Sawtimber accounts for 75 percent of the Forest's total volume cut and sold annually. The 2001 prices for Forest Service stumpage were $229.75/MBF for Douglas-fir and lodgepole pine and $95.54/MBF for subalpine fir. Firewood historically accounts for about 20 percent of the total recorded volume from the Forest, and on average, firewood sells for $20/MBF. Other products, including Christmas trees, post, and poles, make up the remainder of the volume sold on the Forest. The Forest generated about $1,296,000 in timber-related revenues in 2000 through the sale of timber, firewood, Christmas trees and other forest products.

Figure 3. 11 Caribou National Forest Total Timber Volume Offered, Sold, and Harvested, Fiscal Year 1986-2001.

(Source: USDA Forest Service, Caribou National Forest. TSPIRS. STARS.)



About 50 wood products are related to the manufacturing business within the study area, including logging companies, sawmills, and cabinet/millwork operations. Three mills purchase their supply from the Forest: Stoddard Lumber in Madison County, Idaho, Yellowstone Log Homes in Jefferson County, Idaho, and Jensen Lumber Company within the study area in Bear Lake County, Idaho. Two other commercial buyers have recently purchased timber from the Forest: Mountain Valley Timber Company in Iron County, Utah, and Louisiana Pacific Corporation in Kootenai County, Idaho. Demand for most commercial wood products, including sawtimber remains at about 11 MMBF a year (Padian, pers. comm. 2002).

In direct jobs, the wood products industry employs just over 100 people within the study area. Not all these jobs and the associated income are likely to be related to Caribou National Forest timber or wood product harvesting. Table 3.14 highlights the estimated employment and associated annual average labor income. Secondary manufacturing employment, such as cabinets, millwork, and construction, are not included. Only counties within the study area were considered, although not all of these jobs or wages are directly linked with timber harvest from the Caribou National Forest, much of the supply for these positions comes from a combination of federal, state and private lands.

Table 3. 14 Wood Products Employment and Labor Income Information, 1999.

(Source: IMPLAN Pro, 2002.)

Sector	Employment	Labor Income
	Average Annual Jobs	Average Annual Dollars
Logging	24	$33,001
Sawmills	78	$39,057

Recreation and Tourism

Recreation visits to the Forest have increased an average of four percent per year since 1980. Developed site uses, camping, and picnicking will likely increase as the analysis area's population continues to increase. Trail uses are currently increasing at a higher rate due to the growing popularity of all terrain vehicles, mountain bikes, cross-country skiing and snowmachines. Some recreational uses, such as fishing and hunting, have declined slightly (Benson and Stegner, 1995). For specific trends and information concerning recreation and tourism activity in the Forest, refer to the Recreation section of this FEIS.

The recreation and tourism industry is difficult to analyze because much of the goods and services used by visitors are the same as those purchased by residents of an area. Sectors are highlighted that are most commonly associated with recreation and tourism activity, but it should be noted that not all activity within these sectors is directly related to visitor spending. Table 3.15 highlights the estimated employment and associated annual average labor income of several recreation- and tourism-related sectors within the analysis area. Only counties within the study area were considered, although not all of these jobs or wages are directly linked with recreation and tourism associated with the Caribou National Forest. The employment numbers are significant while wages are fairly low when compared to other resource sectors, but the model combines all part-time, seasonal, and full time jobs as well as proprietor incomes into the annual figures. Depending on the type of position an individual holds, their salary will likely vary from the average listed below.

Table 3. 15 Forest Recreation- and Tourism-Related Employment and Labor Income Information, 1999.

(Source: IMPLAN Pro, 2002.)

Sector	Employment	Labor Income
	Average Annual Jobs	**Average Annual Dollars**
Eating and Drinking	9,015	$12,239
Retail	6,283	$12,073
Hotels and Lodging Places	1,595	$16,098
Amusement and Recreation Services	1,403	$14,480

Water Uses

No direct revenues are received for water resources on the Caribou National Forest. The demand for water leaving the Forest often exceeds the available supply. This situation is expected to continue into the foreseeable future. The largest single use of this water in southeast Idaho is agriculture irrigation. Water is also used for domestic, recreation, and municipal purposes. Various state and federal agencies regulated use in response to a variety of competing needs, including fish habitat.

Few changes in the downstream use of the water have occurred over the last decade. In recent years, demands for minimum instream flows from recreationists, fishers, and boaters have increased. Demands for periodic water flows for flushing immature endangered salmon

through the Snake and Columbia River systems have also increased as part of a strategy to recover these species.

As the human population of the area continues to grow, conflicts are expected to increase between competing uses of the water supply, particularly in low snow pack years. For more information on Forest water resources, see Issue 6, Watershed/Riparian and Aquatic Habitat section of this FEIS.

OTHER RESOURCE USES AND VALUES

More people are using the Forest in many different ways affecting a variety of resources. The overall level of use is expected to continue to increase in the future and will not be uniformly applied across all forest resources. Use will not be distributed over the landscape in the same proportions as in the past. Human use is expected to increase simply because population projections show the area and the nation as a whole will continue to grow as discussed above. Population growth puts pressure on forest resources whether in the form of those using the Forest for its amenities or those seeking forest products.

Social ties to the Forest are often as important or more important to people and have not been measured in the above economic analysis. Such social ties include scenery for residents, second homeowners, and visitors the area. Local residents, visitors, and people from around the country value the varied recreation opportunities on the Forest as well as the clean water and air, wildlife habitat, and open space the Forest provides. Uses and values of individual forest resources are highlighted in each individual section of this FEIS.

SPECIAL FOREST PRODUCTS

Special forest products are forest-derived biological resources other than timber products or forage. They primarily include berries, cones, medicinal herbs, edible mushrooms, floral trade items, and other herbaceous plans, boughs, burls and other specialty woods. The products are important to many rural areas and provide sources food, income, medicine, and recreation. Permits are not required for the gathering of most special forest precuts unless they are harvested for commercial purposes or specific exceptions. Approximately forty to fifty personal use permits are sold annually on the Forest for special forest products including seed cones, ornamental wood plants, and boughs. Future demand is expected to remain the same or increase some over time.

REVENUES TO THE STATE

Under the 25% 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, Congress enacted the Secure Rural Schools and Community Self Determination Act of 2000, 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 (the full

payment amount is 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 Caribou NF have selected the stabilized payments.

Table 3.16 displays the full payments made to counties based on the Secure Payment language and the payments related to Caribou National Forest receipts under Title I, II and III in the Act. 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 3. 16 25 Percent Fund Payments to Counties from Caribou, 2001.

(Source: USDA Forest Service, Washington Office. 2001.)

County	Caribou NF Full Payment	Caribou NF Title I	Caribou NF Title II	Caribou NF Title III
Bannock	$31,606	$31,606	na	na
Bear Lake	$94,513	$38,594	na	na
Bingham	Na	na	na	na
Bonneville	$148,607	$80,385	$11,348	$2,837
Caribou	$105,251	$84,100	$14,841	na
Franklin	$58,248	$7,803	na	na
Oneida	$23,400	$19,551	na	na
Power	$7,598	$1,299	na	na
Box Elder Co., UT	$24,008	$1,250	na	na
Lincoln Co., WY	$152,050	$1,123	na	$198

na = not applicable

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, pers. comm., July, 2000). Table 3.17 displays the amounts of PILT payments to counties in fiscal years 1997 - 2001.

Table 3. 17 Total PILT Payments to Counties by Fiscal Years, 1997-2001.

(Sources: University of Idaho, Federal Compensation to Idaho for Public Domain Federal Lands, 1988-99. USDI Bureau of Land Management, Payment in Lieu of Taxes, Fiscal Years 1997-20001.)

County	1997	1998	1999	2000	2001
	Nominal Dollars[1]				
Bannock	$150,202	$149,415	$154,159	$162,266	$233,841
Bear Lake	$187,340	$190,248	$185,433	$203,921	$295,886
Bingham	$228,456	$228,462	$236,008	$248,221	$355,370
Bonneville	$417,185	$419,655	$433,928	$457,902	$660,811
Caribou	$166,688	$179,510	$182,420	$182,940	$291,158
Franklin	$87,835	$90,534	$84,638	$96,055	$139,762
Oneida	$180,569	$188,115	$193,290	$206,736	$296,806
Power	$209,847	$209,849	$216,769	$228,262	$326,752
Lincoln Co, Wy	$344,289	$362,946	$393,565	$418,646	$616,591

1 Nominal means a value stated as "par" value, distinquished from actual or market value. Nominal wages are wages stated in terms of money paid, not in terms of purchasing power.

Issue

3

Ecosystem Management

Background

ECOSYSTEM MANAGEMENT

Ecosystem management is the skillful, integrated use of ecological knowledge at various scales to produce desired resource values, products, services and conditions in ways that also sustain the diversity and productivity of ecosystems (USDA-FS, 1994, ***Region 5 Ecosystem Management Guidebook)***. It focuses on achieving a desired condition and includes goals of maintaining linkages and processes, patterns, and productivity. Ecosystem management does not advocate preservation or the return to some ideal "natural state," but rather maintenance of the integrity of the forest ecosystem and the production of goods and services within these capabilities. The goal of ecosystem management is to restore and/or sustain the health, productivity and biological diversity of ecosystems and the overall quality of life through a resource management approach that is more fully integrated with social values and economic goals. One of the main distinctions of ecosystem management is the emphasis on retaining and maintaining the processes and functions that keep the natural environment resilient to disturbances, such as fire, drought, insects and disease, and human-caused disturbances.

The Forest Service, in its 1994 "National Framework for Ecosystem Management", defined ecosystem management as a ". . . concept of natural resources management wherein National Forest activities are considered within the context of economic, ecological, and social interactions within a defined area or region, over both the short and long term." The Forest Service "Mission, Vision, and Guiding Principles" stated that the agency uses " . . . an ecological approach to the multiple-use management of the National Forests and Grasslands" and ". . . the best scientific knowledge in making decisions and select the most appropriate technologies in the management of resources." The Washington Office of the Forest Service, in the appeal decision on the Targhee Revised Forest Plan describes the history of ecosystem management in federal agencies:

> *"The Forest Service was one of the first agencies in the Federal Government to adopt an ecological approach to managing public lands. In 1992, former Chief F. Dale Robertson stated that an ecological approach would be used to achieve the multiple-use management of the national forests and grasslands and that the needs of people and environmental values must be blended in such a way that the national forests and grasslands represent diverse, healthy, productive, and sustainable ecosystems. According to a Congressional Research Service study on this subject in 1994, no fewer than 18 Federal agencies had committed to the principles of ecosystem management within the next couple of years, and similar support was found in an increasing number of natural resource managers at state and local levels as well as in the private sector. The President Bill Clinton talked*

about ecosystem management in conjunction with the Forest Plan for the Pacific Northwest and the White House established a Federal Interagency Ecosystem Management Task Force comprised of sub-cabinet officials from 15 Departments including Agriculture, Interior, Defense, Energy, Transportation and others, which was producing materials linking healthy ecosystems and sustainable economies. [Former] Vice President Al Gore's "National Performance Review" recommended that federal agencies ". . . adopt a proactive approach to ensuring a sustainable economy and a sustainable environment through ecosystem management."

The Forest Service is not required by law or regulation to follow any specific guidelines concerning ecosystem management in plan revisions; instead the Forest must define Ecosystem Management "in a manner consistent with the above agency-wide policy" (Targhee RFP Appeal Decision, 2002).

The following over-arching ecosystem management goals provide a framework that merges science and ecosystem capability with societal values to help make choices about dynamic systems (USFS/BLM, 1996). These goals are the ecological centerpiece of the Forest Plan revision:

- Maintain ecological processes.
- Manage in the context of multiple ecological scales and time frames.
- Manage viable populations of native and desired non-native species.
- Encourage social and economic resiliency.
- Manage for a human sense of place.
- Manage to maintain the mix of ecosystem goods, functions, and conditions that society wants.

Considerable debate continues on the latitude humans should assume for manipulating ecosystems for their own purposes that include both short- and long-term aspects of human interaction with the environment. In the short term, ecosystems provide goods, services and experiences for many people. In the long run, ecosystems must be sustained if they are to provide the same opportunities for coming generations. The challenge of ecosystem management is to balance the short-term demands for products and services with the long-term need for sustainability.

Prior to beginning work on the Revised Plan, the Forest established a process for implementing ecosystem management during the Forest Plan revision. The Forest identified the principles of ecosystem management and documented how they would act upon those principles. The framework for this approach to ecosystem management is described in detail in Chapter 2 of the ***Initial Analysis of the Management Situation*** (USDA-FS, 1999). The intent of these management activities will be to progress toward a desired future condition or goal. Some concepts, principles, and goals of ecosystem management that will be incorporated into future decisions and actions are discussed here.

An ecosystem approach recognizes the interrelationship between natural systems and healthy, resilient economies. It uses integrated ecological, economic and social analyses to guide the management of lands and water for products, services, and conservation of biodiversity through goals based on a collaboratively developed vision of desired conditions. It is applied within a geographic framework defined primarily by ecological boundaries (***Report of the Interagency Ecosystem Management Task Force, June 1995***). Under ecosystem management, products and services are part of the objective of management. Intensive management activities have a place in ecosystem management and can be appropriate in time and space. Ground disturbing activities may continue to use traditional techniques; however, comprehensive analysis determines what techniques to use, where and when to use them, the suitable mix of technological tools, and the intensity of applications biodiversity. Future decisions and actions require sustainable management that considers a long-term balance between the properly functioning condition of basic ecosystem components and uses that ensure the continuing productivity of renewable resources under Forest Service stewardship.

In ecosystem management, ecosystems are viewed in terms of a hierarchy: components have time, space, and social dimensions. This hierarchy provides a scientific basis for classifying ecosystems into successively smaller, more homogenous units. In terms of management, options should be assessed at several scales. All ecosystems are limited in the amount of plants, animals, and human demands they can supply, but within these limitations, the percentage of each can vary. In this regard, understanding must occur between individuals and groups who have various opinions about the percentage of plants, animals, and humans that describe the Desired Future Condition (DFC) of an ecosystem. Since ecosystems are not always predictable, comprehensive monitoring and adaptive management are needed to integrate research and new information as it becomes available.

The following basic concepts of ecosystem management have been used in shaping alternatives for future management of the Caribou National Forest.

Sustainable Management

Sustainable management means the use of lands "in a way, and at a rate that maintain[s] their biodiversity, productivity, regeneration capacity, vitality and…potential to fulfill relevant ecological, economic and social functions" (Williams, 1998). Sustainability is rooted in human values, and as those values shift and interact, so does the concept of sustainable management. Natural ecosystems adapt to climate, population, and other changes. In the same way, a sustainable system must be dynamic.

Sustainable management requires a long-term balance between the renewability of basic ecosystem components and uses to ensure the continuing productivity of the Nation's renewable resources. Although ecosystems may be out of balance in the short run, it is the long-term relationship between ecosystem development and resource extraction and use that determines sustainability. Sustainable management uses resource flows from existing stocks without compromising the renewability of the resource for future use. Such management

involves, in part, capturing "losses" and mortality that would otherwise occur naturally. Grazing uses a portion of grass for forage that might otherwise die and decompose as seasons change. Logging uses a portion of wood for human consumption use and leaves some to eventually die and decay. The challenge is to balance competitive and changing demands, both commodity and non-commodity, on our renewable resources, while ensuring that ecosystems are managed on a long-term sustainable basis (Fredrick and Sedjo, 1991).

Succession

Ecosystems constantly change through the process of succession. Succession is the orderly process of biotic community development that involves species, structure and community changes over time. Succession can be primary (occurring on a bare area such as a landslide that has not been previously occupied by plants or animals), or secondary (occurring after the destruction of the vegetation in an area). Succession can also mean the progressive replacement of plant communities on a site, which leads to the potential natural plant community.

The concept of succession is tied to ecosystem health. Proper functioning means vegetation and ground cover composition and structure maintain soil conditions that can sustain natural biotic communities and are resilient to disturbances, both natural and man-made. The Forest Plan Revision has considered the process of succession and the plant and animal species dependent on successional stages. The term "succession" will be used to mean the directional composition change in an ecosystem as the available biota modify and respond to changes in the environment. The pace at which succession proceeds depends on the competitive abilities of the species involved, tolerance to the environmental conditions brought about by changes in physical characteristics, the interactions between humans, plants and animals, and disturbances. Management will be based on proposed desired ranges of future conditions relative to quantities and spatial arrangements of seral stages.

Biodiversity

Composition, structure and function determine the biodiversity of an area (Noss, 1990). Composition is the identity and variety of elements in a collection, and includes species and their diversity area. Structure is the physical organization or pattern of the elements of a system area. Function involves ecological and evolutionary processes, such as energy flow, disturbances and nutrient cycling area (Noss, 1990).

Boundaries

Boundaries are used to consolidate and group areas. They can be boundaries that encompass similar biophysical patterns and processes (for example, existing vegetation, potential natural vegetation, regional climate, geology, and landform) or boundaries that encompass similar hydrologic and aquatic processes (for example, river basin, and watershed boundaries).

Scale

The scale of an ecosystem refers to the spatial (space) and temporal (time) dimensions of the system. How large an area does the system occupy and over what period of time does the system description pertain? The issue or concern that is being addressed determines scale, in both space and time. In some cases, ecosystem components cannot be adequately addressed using broad or "coarse filter" resolution data (O'Neill, *et al*, 1986). For example, habitat conditions for species with small home ranges cannot be adequately assessed with broad resolution data. Similarly, economic patterns in rural communities may be analyzed more appropriately at the landscape level.

No single assessment can adequately address the complex issues facing resource managers today. Broad-scale assessments on large geographic areas (i.e., Upper Columbia River Basin Assessment) address general trends, rates of change in resource conditions, and description of existing conditions for key biophysical and social components. Typically, these assessments use "coarse-resolution" information on the spatial patterns of resources (for example, species distribution) and associated risks to resource values or for fire and insect hazard). Mid-scale assessments provide more specific information on patterns of vegetation composition and structure as well as trends in social well being for communities of interest stratified by counties or groups of counties. Fine-scale assessments provide the greatest detail and may cover landscapes, watersheds, or individual project sites.

ECOSYSTEM MANAGEMENT IN PLANNING

Since ecosystem management is holistic and includes social and economic values, the impacts of Forest management on it are displayed in all of the issue discussions. This section, however, deals only with the vegetation communities and disturbance processes. The following discussion explains how the Forest applied these theories to the vegetation communities on the Forest using the properly functioning condition process at various scales.

ECOSYSTEM PROPERLY FUNCTIONING CONDITION (PFC) CONCEPT

In 1996, the Regional Forester for the Intermountain Region commissioned a team of specialists to develop a process for assessing forest conditions at a subregional level. The process uses ecosystem management principles and concepts developed by the USDI, Bureau of Land Management (USDI TR 1737-9). The concept most basic and inherent "in the properly functioning condition (PFC) approach is sustainability of ecosystem composition, structure and function" (Williams, 1998). Ecosystems at any temporal or spatial scale are in a properly functioning condition when they are dynamic and resilient to disturbances to structure, composition and processes of their biological or physical components (USDA-FS, 1996). The PFC approach assumes that when an ecosystem is in this state it is in "properly functioning condition." PFC can be used to "identify 'at risk' ecosystems by assessing conditions of [the] indicators and then [developing] future site-specific management actions … to address the risk" (Targhee RFP Appeal Decision, 2002). Risk refers to situations in which the outcome is not certain, but the chance of system degradation beyond the point of resiliency and sustainability can be estimated.

The first step in the PFC process is to establish the Historical Range of Variation (HRV) of ecosystems. HRV refers to the range of conditions and processes likely to have occurred prior to settlement by Euro-Americans (about the mid 1800s). “By understanding how ecosystems have functioned in the past and successfully maintained themselves, we gain insight into characteristics of healthy ecosystems” (Targhee RFP Appeal Decision, 2002). HRV provides reference points from which change can be measured, **not** a condition that ecosystem management tries to attain. In fact, science findings suggest that typically such a condition could not be achieved. This misunderstanding about HRV is common, as is the tendency to equate HRV with "natural" conditions (USDA-FS/USDI-BLM, 1996).

Information on historic variation can be used as a reference point to make comparisons to existing conditions. It can also be used, along with other factors, to provide management options for achieving a desired future condition (USDA-FS, Grays Range EIS, 1995). The HRV is expressed in terms of the following attributes of an ecosystem:

- Structure is a means to express the balance of age and size classes for vegetation types.
- Composition is an expression of species present in each vegetation type.
- Disturbance processes, both natural and human-induced, are discrete events causing a change in conditions. All disturbances have five components that are relevant to assessing ecosystem effects: 1) severity; 2) frequency of occurrence; 3) duration; 4) spatial scale (regime); and 5) point(s) of interaction with ecosystem components (Lugo, 1994).
- Patterns are an indication of how ecosystems function among and between themselves.

Again, the Caribou Revised Forest Plan does not recommend that the Sub-Regional PFC Assessment be used as a management prescription/strategy. PFC is not a management strategy by itself, rather it is a tool used to “maintain or enhance ecological processes and biodiversity, and to use adaptive management strategies to gain an understanding during project implementation and maintain and restore” functioning ecosystems (Targhee RFP Appeal Decision, 2002). The assessment has been used to identify certain ecosystem components that are outside of their HRV and to develop priorities for management emphasis. This emphasis varies by alternative depending on the issues addressed by the alternative. For instance, Alternative 4 emphasizes treatments to move more aggressively towards the HRV while Alternative 7R focuses treatments in aspen communities.

Using Assessments at Multiple Scales

As stated previously, one of the concepts of ecosystem management is that one must look at various spatial and temporal scales. Information from broad-scale assessments, such as the Interior Columbia River Basin Assessment, help set the context for mid-scale Forest planning and fine-scale project implementation. Forest resource specialists used information from broad scale assessments in many aspects of the revision process. The Forest Plan itself, then, is a mid-scale assessment from which fine-scale analyses promulgate. The Forest used (or will use) assessments at three scales: regional, sub-regional scale and landscape. Information from many sources was used for these assessments. Some of the findings are discussed below.

Interior Columbia River Basin Ecosystem Management Project Scientific Assessment (Broad Scale)

The Forest's revision process used the ICBEMP scientific assessment and the Regional Properly Functioning Condition Rapid Assessment Process as the starting points for assessing the condition of the Forest's vegetation communities. As part of the Upper Columbia River Basin (UCRB) project and ICBEMP, a Science Integration Team (SIT) was chartered to conduct a broad-scale assessment of the area. Members of the SIT compiled detailed reports of historic and current conditions of ecosystem components. These reports were compiled into the "Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins" (USDA/USDI 1996). This document "links landscape, aquatic, terrestrial, social and economic characteristics" to describe conditions in the over 144 million-acre area. The following is a very brief summary of ecological integrity and risk ratings **for vegetation** from the Integrated Science Assessment used to frame the conditions on the Caribou National Forest.

Throughout the Columbia River Basin, native grasslands have decreased by 70 percent, shrublands by 30 percent, and old forest structures by 27 to 60 percent. In general, the greatest change in processes and patterns has occurred near roads as a result of management activities. In the Basin, 17 percent of the forested subbasins and 6 percent of the rangeland subbasins had high ecological integrity. On the Caribou NF, the forested subbasins were rated as "high," and the rangeland subbasins were rated as "low" in ecological integrity. All of the subbasins on the Forest had moderate aquatic integrity ratings but low composite ecological integrity. The latter is a measurement of how much the ecological processes and functions have been altered (USDA/USDI, 1996).

The forested, rangeland and aquatic components were then broken down into vegetation community groups in the Integrated Science Assessment and other documents published as part of the ICBEMP project. The Forest IDT used the descriptions of historic structure, composition, and patterns from these documents to validate and substantiate the historic range of variation used for the Caribou NF.

These characteristics were used in the sub-regional PFC assessment, described below. See the Project File, Ecosystem Management for the step-down from findings in the ICEBMP Scientific Assessments to the PFC Assessment on the Caribou NF and finally to the Desired Future Conditions in the Forest Plan alternatives.

Caribou Sub-Regional PFC Assessment (Mid-scale)

In 1997, the Forest's ecosystem condition was assessed using the Rapid Assessment for determining Properly Functioning Condition (PFC) process approved by the Intermountain Region. As described above, properly functioning conditions are achieved when ecosystems sustain sufficient complexity, diversity, resiliency and productivity to provide for specified human needs and values (USDA-FS, USDI-BLM, 1997). The Forest's PFC process used species composition, structure, patterns, and disturbance regimes to assess ecosystem condition or health by cover type. Using available information and research, the Forest IDT described the historical disturbance regimes and vegetative patterns across the landscape (HRV). Comparing current conditions with those expected historically, the Forest

determined the relative departure from properly functioning or sustainable conditions. More information on this process can be found in the Initial Analysis of the Management Situation (1999), Intermountain Region Properly Functioning Condition Rapid Assessment Process (1997), Caribou National Forest Subregional PFC Assessment (1998), and Ecosystem PFC Assessment Process Paper (1999).

Forest historical accounts, such as "A History of the Caribou," stand examination data, photo records, and the "Timber Reconnaissance, Caribou National Forest (1913-1915) provided information used to develop the HRV for vegetation communities on the Forest. Other documents such as the "Final Report: Fire Regimes on the Caribou National Forest in Southeastern Idaho" (Barrett, 1994), archeological records, and other pertinent historical journals were used.

Collectively, this information was used to develop assumptions about the role disturbances such as fire, climate, timber harvesting, mining, road-building, and grazing have had on the development of present day conditions. This information was validated by local Forest specialists' knowledge, scientific literature and research as described later in this Chapter.

The HRV for vegetation communities and disturbance processes are described further in this section as well as Appendix D - Ecosystem Management on the Caribou NF. For example, the historic structure, composition, species, and disturbance processes are described briefly for each vegetation community. Following this, current conditions of the same factors are displayed. The differences are then compared to show how the communities have departed from historic, or properly functioning, conditions. In Chapter 4, the changes to these same parameters from implementing the alternatives are described.

Landscape or Watershed Assessments (Fine-Scale)

Landscape or watershed analysis will then be used to identify systems at risk at a project-level scale. During these analyses, vegetation community characteristics will be compared to the desired conditions identified in the Revised Forest Plan. A variety of management recommendations may be made to move "at risk" communities towards desired conditions. These activities could be passive or active, depending on the components that are not functioning properly. Assessments at this scale will not be described in this EIS.

DESIRED RANGES OF FUTURE CONDITIONS STATEMENTS

According to the Committee of Scientists Report, forest planning should focus on what is left on the land, rather than what is removed. A desired future condition (DFC) statement is a clear conceptual picture of this desired future state - the ecological conditions we wish to leave on the land. This vision is long-term in nature and should be consistent with ecosystem management principles of maintaining biological diversity while contributing to community and economic stability. DFC statements are broad and general but still provide a realistic target toward which specific implementation actions may be directed. The DFCs are the foundation for the goals, objectives, standards and guidelines in the Revised Forest Plan (Targhee Appeal Decision, 2002).

During the Revision process the Forest developed DFC for all resource areas, including those described in this section: disturbances, forested vegetation, and non-forested vegetation. As described, the Caribou PFC Assessment was one of the many tools used to develop the DFCs for vegetation communities on the Forest. One of the requirements for a Forest Plan is to plan for sustainable conditions (36 CFR 219.1, Purpose and Principles). According to the principles of ecosystem management, systems are most sustainable when they are near their HRV. If ecologically sustainable ecosystems are the desired state at the end of the planning period, management actions should emphasize a trend toward the historical range of variability or a properly functioning condition of the Forest's vegetation communities.

Ecosystem Disturbances

Analysis Scale: Forest-wide

Issue:

Forest Plan Alternatives emphasize different agents and amounts of disturbance to manage Forest resources, which may affect the amount of vegetation at risk to insect epidemics and uncharacteristically large wildfires.

Indicators:

♦ **EM.1 Insect Hazard Rating: A relative rating with a range of: Low; Low-Moderate; Moderate; Moderate-High; and High**

Baseline Indicator: Moderate

♦ **EM.2 Wildfire Hazard Rating - A relative rating with a range of: Low; Low-Moderate; Moderate; Moderate-High; and High for forested and non-forested vegetation**

Baseline Indicator: Forested = Moderate to High, Non-Forested = Low-Moderate

♦ **EM.3 Fire Condition Class – a relative rating of the potential for uncharacteristically large wildfires with a range of: Low; Low-Moderate; Moderate: Moderate-High; and High.**

Baseline Indicator: See Table 3.25

BACKGROUND TO ISSUE

Some people suggest that only natural disturbances such as wildfire, wind-throw, insects, and diseases should be used to manage Forest resources. They suggest that human-induced disturbances, such as timber harvest and livestock grazing, should be prohibited.

Others feel that fire disturbances, such as prescribed fire and wildfire, should be used to manage Forest resources.

Others suggest that a combination of active ecosystem management practices, such as regeneration harvest; harvest to manage insect and disease risk, prescribed fires, wildfires, and livestock grazing should be used to manage Forest resources.
Forest Plan alternatives emphasize different agents and amounts of disturbance to manage Forest resources, which may affect the amount of vegetation at risk to uncharacteristic disturbance. Information on the National Fire Plan is located in Chapter 3, Other Resources, Fire Management section.

Current Conditions

INTRODUCTION

Disturbance is a vital process in all ecosystems (White and Pickett 1985) and is common when viewed from a long-term perspective (Oliver and Larson, 1990). Disturbance is defined as a discrete event, either natural or human-induced, that causes change in the existing condition of an ecological system (Kaufman, *et al,* 1994). Disturbances include fire, wind throw, insect outbreaks, and a myriad of other events.

Disturbances release resources, such as light, moisture, nutrients, space, for use by individuals of species with life history traits allowing them to persist through the disturbance, and those species with the ability to take advantage of the altered environmental conditions (Noble and Slatyer 1980, Roberts and Betz, 1999). The desired condition is that Forest ecosystems contain sufficient complexity, diversity, and productivity that they are resilient to disturbances. Resilience is defined as the ability to absorb stress or change without significant loss of function (Franklin *et al,* 1985). These resilient ecosystems will allow essential ecosystem processes to operate, and provide for human needs and values (USDA Forest Service, 1994).

Agents of disturbance often act synergistically, particularly at the landscape scale (Rogers, 1996). For example, drought and mountain pine beetle (*Dendroctonus ponderosae*) can have a great impact on the fire dynamics of lodgepole pine (*Pinus contorta* var. *latifolia*) (Amman, 1978). Lodgepole pine stands often lack enough fuel to carry fire, particularly at the younger stages of succession (Brown 1975, Omi and Kalabokidis, 1991). Fuel accumulates leading to conditions favorable to a stand-replacing fire during subsequent droughts, as these stands mature and are affected by mortality from mountain pine beetle during periods of drought, and the cycle begins again.

Many disturbances do not cause significant changes in the species composition and structure of vegetative ecosystems. Diseases, for example, typically have not caused changes in the composition and structure of stands on the Forest. More often, insects and wildfire, the natural disturbance agents, have caused significant changes to the composition and structure of Forest stands.

HUMAN-INDUCED DISTURBANCE

Human-induced disturbance events that have had a significant impact on the species composition and structure of the Forest include regeneration harvest and prescribed fire. The estimated acres affected by these disturbance agents are shown in Table 3.18. The majority of acres that have been treated by regeneration harvest since 1966 were those previously affected by insects and diseases, primarily dwarf mistletoe and mountain pine beetle in lodgepole pine stands, and by Douglas-fir bark beetle in Douglas-fir stands. The majority

(approximately eighty-five percent) of the acres treated with prescribed fire since 1970 have been sagebrush and mountain brush, which generally exhibit shorter fire return intervals than forested vegetation types.

Table 3. 18. Estimated Acres Affected by Harvest and Prescribed Fire.

Disturbance	Time Period	Acres	Acres per Year
Regeneration Harvest	1966-2000	22,000	630
Prescribed Fire	1970-2000	30,000	970
Total			**1,600**

Livestock grazing has been another source of disturbance throughout the Forest. Historic and current grazing levels are described in Chapter 3, Issue 4 Livestock Grazing, History of Livestock Grazing. Past levels of grazing affected understory composition and in many areas, affected regeneration of the overstory plants. For instance, past sever grazing reduced regeneration of some aspen clones. This disturbance, however, may have accelerated the increase in canopy density of juniper and maple types. These impacts are further discussed in the Non-forested Vegetation section of this issue.

NATURAL DISTURBANCE

Natural disturbance events include wildfire, insects, diseases, flooding, earthquakes, and wind-throw. Common fungal diseases on the Forest include various root rots (*Armilleria ostoyae*, *Phellinus weirii*, *Heterobasidion annosum,* and *Phaeolus schweinitzii*) and rusts (*Cronartium comandrae*, and *Endocronartium harknessii)*. Dwarf mistletoes (*Arceuthobium* ssp.), which are actually parasitic plants, are also widespread. Although *Arceuthobium americanum* has affected many of the lodgepole pine stands and *A. douglasii* has affected isolated Douglas-fir stands, dwarf mistletoes generally have not caused changes in the species composition and structure of these stands. They have, however, killed or injured many individual trees but do not generally get concentrated enough to kill entire stands.

Wind-throw has caused changes in composition and structure of forest stands, but its effects have been very limited, affecting only a small fraction of one percent of the Forest over the past fifty years. The effects of wind-throw and diseases on the Forest generally have not been significant in the past.

Prescribed fire and regeneration harvest have been important human-induced disturbances on the Forest. The effects of insects and wildfire have been more significant. Common insects include mountain pine beetle (*Dendroctonus ponderosae*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), spruce beetle (*Dendroctonus rufipennis*), western balsam bark beetle (*Dryocoetes confusus*), and western spruce budworm (*Choristoneura occidentalis*).

Although insects have affected trees on approximately sixty to seventy percent of the forested vegetation on the Forest over the past fifty years, western balsam bark beetle and western spruce budworm have not caused significant changes in the species composition and

structure of Forest stands. Douglas-fir bark beetle, and to a lesser extent spruce beetle, are responsible for a small amount of the change; however, the majority of the change in the species composition and structure of Forest stands has been caused by mountain pine beetle. In these stands, the beetles have killed off a significant number of trees. In the pockets of dead and dying trees, structure and composition both are changed. Fire hazards are also increased due to the amount of dead, dried out trees.

Historically, wildfire is the disturbance agent that has the largest impact on the species composition and structure of Forest stands (Barrett, 1994). Fire regimes on the Forest are predominantly mixed severity and lethal severity regimes that periodically remove most of the existing vegetation from the sites affected (See the Fire Management Section in this chapter). On an annual basis, approximately 1.9 percent (Fire Management Process Paper) to 3.6 percent (Barrett, 1994) of the Forest has been affected by wildfires that were within the historic fire regime range. Overall, due primarily to effective fire suppression, only 1/10th of one percent of the Forest has burned annually since 1970.

This discussion will focus on the two most widespread natural disturbance agents, insects and wildfire, which have caused changes in the species composition and structure of Forest stands. The estimated acres affected by these disturbances are shown in Table 3.19. Historically, the disturbance that has had the greatest impact on vegetation composition and structure across the landscape is wildfire, which often leaves long-lasting evidence of its passage (Heinselman, 1981, Arno and Sneck, 1977, Barrett, 1994), although the effects of insects have become more pronounced as forest stands have aged in the absence of disturbance (Barrett, 1994). These older stands tend to be more overcrowded and the trees are stressed for nutrients, light, water and other essentials. The stressed trees are less able to fight off insects and diseases. The insects and diseases, in turn, are more readily transmitted from tree to tree in crowded dense stands. Thus, while insects and diseases can be present in any stand of trees, they have more of an effect in overcrowded and/or aging stands.

Table 3. 19. Estimated Acres Affected by Natural Disturbances.

Disturbance	Time Period	Acres	Acres per Year
Insects	1985-2000	65,000	4,060
Wildfire	1970-2000	37,540	1,210
Total			5,270

THE ROLE OF FIRE

Fire is natural and a vital ecosystem process (White and Pickett, 1985), and is necessary for sustaining Forest ecosystems, which can all, in some way, be characterized as "fire-dependent" (Atkins, *et al*, 1999). Fire serves many roles in the ecosystem, including reducing biomass, recycling nutrients, regenerating vegetation, and maintaining diverse landscapes (Kozlowski and Ahlgren, 1974, Parsons, 1981). Fire has played a central role in the Forest's ecosystems. The origin of Englemann spruce/subalpine fir, lodgepole pine, Douglas-fir, and most quaking aspen stands on the Forest can be traced to some form of disturbance. Historically, that disturbance was usually fire (Barrett, 1994). Fire suppression

in these communities can affect their susceptibility to insects and diseases and lead to changes in species composition, structure, and diversity (Atkins, *et al,* 1999).

In the early 1900s, particularly after the dramatic wildfires of 1910 in northern Idaho and Montana, public concern for protection from forest fires brought about an era of aggressive fire suppression. The trend has continued to this day, with the effectiveness of suppression increasing greatly with the advent of aerial capabilities and improved road access in the years following World War II (Pyne, 1982). Effective fire suppression has led to the overwhelming majority of the vegetation on the Forest in mature age-classes as shown in Table 3.20.

Table 3. 20. Estimated Percentage of Mature and Old Age Class Vegetation.

Vegetation Type	Mature and Old Age-Classes
Sagebrush[1]	50%
Utah juniper	80%
Rocky Mountain juniper	50%
Curlleaf mountain-mahogany	>70%
Limber pine	>70-80%
Douglas-fir	>70-80%
Quaking aspen	>40-50%[2]
Lodgepole pine	>70-80%
Englemann spruce/Subalpine fir	>70-80%

1 Sagebrush acres show the percent of acres forest-wide in greater than 15 percent canopy cover density.
2 These percentages reflect current aspen acres and do not take into account approximately 140,000 acres that have already succeeded to conifer-dominated communities over time.

The role of fire and the fire severity for the vegetation type/fire groups are described in Table 3.21. Fire severity is a qualitative measure describing the biological impacts of fire, generally expressing the effect of fire on vegetation mortality and the loss of soil organic matter. The severity listed in Table 3.21 is that most commonly associated with a fire typical of that fire group. High-severity or "lethal" fires can, and do, occur in all fire groups, regardless of the "typical" fire.

Table 3. 21. Historic Fire Regimes and the role of fire.

Fire Group	Role of Fire	Fire Severity
Shrubland	Fire-initiated	High
Woodland	Fire-initiated	Mixed
Limber Pine	Fire-maintained	Mixed
Xeric Douglas-fir	Fire-maintained	Mixed
Mesic Douglas-fir	Fire-initiated	Mixed
Quaking aspen	Fire-initiated	High
Lodgepole pine	Fire-initiated	High
Xeric Spruce/Fir	Fire-initiated	Mixed
Mesic Spruce/Fir	Fire-initiated	High

Low-severity fires are fires that have minimal impact on the site (Bradley, *et al,* 1992). These fires burn in surface fuels and consume only the litter, herbaceous material, and foliage and twigs on woody undergrowth (Bradley, *et al,* 1992; Smith and Fischer, 1997). The upper duff layer may be charred, but lower duff and soil layers are not altered (Smith and Fischer, 1997). Morgan, *et al*, (1996) characterize low-severity fires as fires in which more than 70 percent of the basal area and more than 90 percent of the canopy cover of the overstory vegetation survives, while Brown, *et al,* (1994) include 70 to 90 percent overstory survival.

Mixed-severity fires result in moderate effects in the overstory, cause mixed mortality, and produce irregular spatial mosaics resulting from different fire severities (Smith and Fischer, 1997; Barrett, 1994). These fires burn in surface fuels and consume litter, upper duff, understory plants, and foliage on understory trees (Bradley, *et al,* 1992; Smith and Fischer, 1997). Individual and groups of overstory trees are often killed, particularly if fuel ladders are present (Bradley, *et al,* 1992).

High-severity fires burn through the overstory and consume large woody surface fuels; the duff layer is deeply charred and often entirely removed over much of the area (Bradley, *et al,* 1992; Smith and Fischer, 1997). Heat from the fire impacts the upper soil layer and often consumes incorporated soil organic matter (Bradley, *et al,* 1992). These fires are classified as "lethal" either because of extensive overstory mortality, or because heat that is transmitted downward girdles mature trees and kills many roots (Smith and Fischer, 1997). High-severity fires consume or kill more than 80 percent of the basal area or more than 90 percent of the overstory canopy cover (Morgan, *et al*, 1996).

Historic fire regimes are generally based on the habitat type (Daubenmire, 1952; Daubenmire, 1970; Hironaka, *et al,* 1983) or potential natural vegetation. Exceptions are quaking aspen and persistent lodgepole pine where the community type or existing vegetation issued to define those fire groups. Historic fire regimes are assigned to *fire groups*, based on the response of the dominant species to fire, the potential frequency of fire, and the similarity of post-fire succession (Bradley, *et al*, 1992). Fire frequency and the role of fire may vary widely among the different sites and vegetation communities. Each of the major fire regimes is addressed briefly in the following discussion.

Shrubland Habitat Types

This fire group is dominated by sagebrush steppe vegetation and mountain brush. These sites are predominantly big sagebrush (*Artemisia tridentata* ssp.) interspersed with antelope bitterbrush and several grass (bluebunch wheatgrass, Idaho fescue) and forb species. Basin big sagebrush (*A. t.* ssp. *tridentata*), mountain big sagebrush (*A. t.* ssp. *vaseyana* var. *pauciflora*), subalpine big sagebrush (*A. t.* ssp. *vaseyana* var. *vaseyana*), and spiked sagebrush (*A. t.* ssp. *spiciformis*) make up the majority of sagebrush types on the Forest. These types are distributed based on site characteristics including soil depth, precipitation, and insolation. Mountain brush sites often include sagebrush but are distinguished by

containing at least five percent serviceberry, chokecherry, or snowberry, either singly or in combination.

Big sagebrush is not fire-resistant and is easily killed by wildfire. Big sagebrush generally stores seeds in the soil, which germinate as a result of fire-induced heating. Spiked sagebrush is an exception, however, in that it will sprout after a fire. Depending upon climatic conditions and grazing patterns, big sagebrush usually requires twenty to thirty years before returning to pre-fire levels (Bunting, *et al*, 1987; Wambolt, *et al*, 2001). Antelope bitterbrush, as well as grasses and forbs, are scattered within this community. Antelope bitterbrush is generally a weak sprouter, but most grasses and forbs sprout readily and dramatically increase their abundance following a fire. Approximately fifteen percent of the sagebrush communities, such as those dominated by low-growing sagebrush species, are usually not affected by fire (Winward, pers. comm.). They generally do not develop sufficient biomass in either the canopy or understory to adequately carry fire and normally do not compete with the herbaceous understory. Mountain brush shrub species typically sprout following a fire.

Fire history for this group is generally lacking. Barrett (1994) estimated a mean fire return interval of nineteen years for sagebrush-grasslands on the Forest. The fire frequency for mountain big sagebrush and mountain brush has been estimated to be twenty to forty years on the Forest (1997), and ten to thirty years on the Bridger-Teton National Forest (1997).

Conditions on the Caribou

Based on available data, there has been a moderate departure from the historic range of variability for sagebrush at the Forest scale. Many sites have an abundance of sagebrush greater than fifteen percent canopy cover, and a shortage of sagebrush less than or equal to fifteen percent canopy cover. Sagebrush ecosystems have the shortest fire return interval of any vegetation type on the Forest, and are therefore considered to be the most "fire-dependent." When sagebrush canopy cover exceeds fifteen percent, it begins to aggressively compete for resources with the herbaceous species in the understory (grasses and forbs), putting these ecosystems at risk of losing diversity (Winward, 1991). In addition, large expanses of dense sagebrush put these areas at risk from uncharacteristically large wildfires.

Woodland Habitat Types

This diverse group includes several species with differing ecological traits, including Utah juniper, Rocky Mountain juniper, bigtooth maple, and curlleaf mountain-mahogany. They normally do not develop closed canopy stands but form open woodlands. These species typically form the transition zone between shrubland communities at lower elevations and closed forest communities at higher elevations. Mountain-mahogany differs somewhat in that it can occur across a wide range of elevations. Mountain-mahogany can form open stands by itself or in combination with limber pine, juniper, or Douglas-fir.

Utah juniper, Rocky Mountain juniper, and curlleaf mountain mahogany regenerate from seed. Bigtooth maple will sprout following a fire, however. Where juniper exists on very dry, rocky sites, it is almost invulnerable to fire and may use these sites as a refuge to

recolonize an area after a fire. Both juniper species are easily killed by fire when young, become less susceptible to fire as they mature and obtain a thicker bark in widely spaced stands with generally sparse understories. Juniper becomes vulnerable to crown fires if dense stands of the type develop. Bigtooth maple also is readily killed by fire when young, but typically becomes less flammable as it matures and shades out the grasses in the understory that serve as fine fuels to carry a fire. The majority of mountain-mahogany communities are generally not affected by fire because they inhabit rocky sites or sites on thin soils with sparse undergrowth that normally will not sustain fire. Mountain-mahogany that has developed on sites with deeper soils with an understory that can sustain fire is easily killed by fire, however. The majority of woodland is directly adjacent to sagebrush sites, and typically has been affected by fire spreading from the shrubland into the woodland wherever sufficient surface fuel was available.

Conditions on the Caribou

An expansion of woodland species continues to occur into areas historically occupied by sagebrush-grassland ecosystems. Barrett (1994) estimated a mean fire return interval of nineteen years for juniper and woodland vegetation on the Forest. Junipers and maple, and to lesser extent, curlleaf mountain-mahogany, have increased their abundance as a result of fire suppression. Douglas-fir has also become scattered throughout shrubland sites in some areas. There has been significant expansion of Utah juniper into sagebrush and mountain brush sites, and Rocky Mountain juniper has also spread into shrubland sites and riparian areas. Juniper encroachment, in particular, has led to an increase of water uptake by tree species and more bare ground, resulting in higher sediment production rates and poorer watershed conditions.

Historically, fire controlled the expansion of woodland species into shrubland sites. The increase of woodland vegetation has increased the risk of fires of higher intensity than those that traditionally occurred on these sites, and that are more resistant to fire control efforts.

Limber Pine Habitat Types

This fire group consists of limber pine habitat types that occur on drier exposures between 6,000 and 10,000 feet. Limber pines, or limber pine with Douglas-fir, dominate these sites. Lodgepole pine, subalpine fir, and aspen may be minor seral components. These types can occur on drier sites adjacent to forests of Douglas-fir, lodgepole pine, subalpine fir, and Engelmann spruce, or they may form the forest ecotone with sagebrush steppe vegetation. The distribution of limber pine is strongly affected by its dependence on rodents and on Clark's nutcracker, which choose open or treeless areas to cache limber pine seeds for future consumption (Lanner, 1980). These sites do not develop dense overstory canopies but support a scattered to open forest.

Limber pine climax stands typically occur on sites where fuels are light, sparse, and discontinuous. Greater flammability may be encountered where both limber pine and Douglas-fir share site dominance. The greatest fire hazard for this fire group is its proximity to more flammable vegetation. This may be dense forest vegetation or sagebrush steppe, either of which has heavier and more continuous fuel loads. Fire intensity in limber pine

habitat types usually remains low, and flames are unlikely to enter tree crowns even on sites where enough fine fuel is available to carry a fire. The scattered distribution of the trees inhibits fire spread.

Arno and Gruell (1983) reported a mean fire interval of seventy-four years for a limber pine site at a grassland ecotone in southwestern Montana. Keown (1977) reported a fire-free interval of about 100 years for another limber pine site in Montana.

XERIC DOUGLAS-FIR HABITAT TYPES

This group is composed of cool, dry, relatively unproductive Douglas-fir habitat types. Douglas-fir is often the climax species at the lowest forested elevations. Rocky Mountain juniper may be a seral species, and lodgepole pine is occasionally present on some noncalcerous soils. These sites do not develop dense overstories, but support a scattered to open forest.

The combination of widely spaced, thick bark trees and the usually sparse undergrowth results in a low fire hazard for most open stands of old-growth Douglas-fir (Crane and Fisher, 1986). Individual Douglas-fir trees often have branches close to the ground, however, and if sufficient ground fuels are available, torching[9] can occur.

Douglas-fir forests near Jackson, Wyoming probably experienced fire about every 50 to 100 years (Loope and Gruell, 1973). Douglas-fir adjacent to sagebrush steppe vegetation both near Jackson, Wyoming and the valleys of northern Yellowstone National Park appear to have shorter fire-free intervals. Houston (1973) reported fire-free intervals of twenty to twenty-five years in Yellowstone's northern valleys. The typically open forests characteristic of this fire group generally sustain low-intensity thinning fires. Only when very low fuel moistures and high winds coincide are crown fires likely to occur.

MESIC DOUGLAS-FIR HABITAT TYPES

This group consists of relatively moist Douglas-fir habitat types where lodgepole pine, aspen, or Douglas-fir is a major seral species. These habitat types occur on cooler or moist exposures between 5,700 and 8,500 feet in elevation. Limber pine may occur in small amounts on drier microsites within these habitat types.

Fire regimes of Douglas-fir and lodgepole pine are variable over their distribution (Kilgore, 1981). Topography, weather, stand structure, and fuel loading (and arrangement) all contribute to different patterns of fire intensity and frequency. A complete range of fire behavior is represented in this type, from light surface fires to stand-replacement fires. A mosaic of fire effects probably occurred across the historical landscape, with much variability also existing within a single fire (Arno, 1980). Stands are thinned or replaced, and the potential dominance of one species over another is altered. Thinning fires favor Douglas-fir because mature trees are relatively fire resistant. Stand-replacement fires favor seral lodgepole pine or aspen on sites where seeds or suckering roots are available. The success of

[9] **Torching** is the ignition and flare-up of a tree or small group of trees, usually from bottom to top.

aspen regeneration depends partly on the severity of the fire. A high-severity burn may retard or reduce suckering if shallow roots are exposed to lethal heating. Large areas of aspen, lodgepole pine, ceanothus, or pinegrass, may indicate a recent history of severe or repeated burning (Steele, *et al,* 1983.) On some habitat types, shrubs have the potential to dominate stands if fire removes the Douglas-fir overstory.

Arno (1980) reported a mean fire-free interval of fifteen to thirty years for the Douglas-fir series in the northern Rocky Mountains. Houston (1973) estimated a presettlement fire frequency of twenty to twenty-five years for the conifer/sagebrush steppe vegetation in northern Yellowstone Park. In the Jackson area of Wyoming, Loope and Gruell (1973) estimated a fire frequency between fifty to one hundred years for lower elevation conifer forests, which, although moister, appear to reasonably comparable with those in Houston's study. Loope and Gruell (1973) estimated a fire frequency of twenty-five to one hundred years for a Douglas-fir forest with seral aspen on Blacktail Butte in Grand Teton National Park. In southwestern Montana, stands of Douglas-fir on the ecotone between forest and sagebrush-grassland had pre-settlement fire-free intervals of thirty-five to forty years (Arno and Gruell, 1983). Barrett (1994) reported a mean fire return interval of 53 years in Douglas-fir stands on the Forest.

Quaking Aspen-Dominated Community Types

This fire group is composed of community types where aspen appears to be the climax or long-term seral dominant. Aspen is able to tolerate a wide range of environmental conditions and is associated with a diverse number of understory shrub and herbaceous species.

Aspen stands in the Western U.S. may be even-aged or uneven-aged. Uneven-aged stands are more characteristic of situations where aspen is the climax dominant. Here, regeneration takes place as a gradual process, with new suckers establishing as older stems die from age or disease. Uneven-aged structure also occurs where aspen clones are invading surrounding grassland or shrubland. The role of fire here is not clear. Where aspen forms even-aged stands, it is generally seral to one or more conifer species and results from rapid suckering after disturbance. Fire plays a significant role in maintaining and regenerating aspen on these sites.

Aspen has a paradoxical relationship with fire. Individual aspen stems (suckers) have very thin bark that contains a green photosynthetic layer, and thus are very heat sensitive and easily killed by fire. Conversely, aspen clones are very fire resistant in that the clones are very long-lived, periodically sending up suckers after fires. Aspen clones may trace their heritage to a single aspen seedling that germinated thousands of years ago (Kemperman and Barnes, 1976). Western aspen usually matures between sixty and eighty years of age and deteriorates rapidly after 120 years. Fires in aspen and aspen-conifer before and during the mid-19th century were apparently larger and more frequent than they are today (DeByle, *et al*, 1987).

A fire history study of two aspen-conifer sites in the Fontenelle Creek drainage of western Wyoming estimated the mean fire-free interval to be forty and forty-one years, respectively (Arno, 1981). Fires in this area burned in a mosaic pattern with varying severities, from high

intensity stand replacement fires to low severity fires that scarred but did not kill the relatively thin-barked lodgepole pine trees (Arno, 1981). Barrett (1994) reported a mean fire return interval of 69 years in aspen-conifer sites on the Forest.

Conditions on the Caribou

The majority of quaking aspen on the Forest is seral to one or more conifer species. As a result of the lack of disturbance, primarily through fire suppression, there has been a significant decline in the amount of aspen-dominated communities, which have been converted to conifer-dominated communities. The extent of aspen decline on the Forest is estimated to be thirty-three percent, or approximately 140,000 acres (Aspen Process Paper). The decline of aspen on the Forest, while significant, is not as great as that estimated for the neighboring Wasatch-Cache National Forest in Utah where aspen decline was estimated at sixty-six percent, or approximately 245,000 acres (Bartos and Campbell, 1998).

Quaking aspen has been described as a "keystone" species in the western United States (Bartos and Campbell, 1998; Kay, 1997). Aspen communities are upland forests that provide a wide variety of ecological values. When compared to conifer-dominated communities, aspen communities are richer in biodiversity, higher in wildlife diversity, produce more abundant herbaceous communities that offer increased forage for wildlife and livestock, and usually produce increased water yields (Bartos and Campbell, 1998; Kay, 1997). In contrast, conifer communities are lower in biodiversity (Hoffman and Alexander 1987, 1983, 1980; Alexander, *et al*, 1986), contain a sparser herbaceous understory (Mueggler, 1985), and transpire more water on a yearly basis than aspen (Gifford, *et al*, 1984).

Aspen stands are considerably less flammable than conifer stands (Brown and Simmerman, 1986; Wright and Bailey, 1982). Therefore, the conversion of aspen to conifer increases the risk of uncharacteristic wildfire.

Persistent Lodgepole Pine Community Types

This group consists of communities dominated by lodgepole pine that frequently persist for long periods of time, and in some cases appear to be climax. These communities may be the seral stages in habitat types in the Douglas-fir, subalpine fir, Engelmann spruce, and whitebark pine habitat type series. They may be found in areas of cold air drainage or where soils and topography favor lodgepole pine over other species. Large acreages of persistent lodgepole pine develop in acidic soils made up of coarse, alluvial materials with gently sloping to nearly level topography. Drought or nutrient stress may inhibit competition from other conifer species on these sites. The understory of persistent lodgepole pine sites is not usually diverse or dense.

Lodgepole pine is a seral species in habitat types in several fire groups, and the role of fire described for this fire group also applies where it is less persistent. Fire regimes of Douglas-fir and lodgepole pine are variable over their distribution (Kilgore, 1981). Topography, weather, stand structure, and fuel loading and arrangement all contribute to different patterns of fire intensity and frequency.

Fire perpetuates or renews stands of lodgepole pine. Where it is a seral species, without fire or other disturbance shade-tolerant trees will replace lodgepole pine because of its shade-intolerance and mineral seedbed requirement. Lodgepole pine may have serotinous[10] (closed) or open cones. The degree of serotiny can affect the age distribution on a site. Seed from open-coned trees tend to produce uneven-aged stands, where seedlings establish over a period of years. Closed-cone trees generally produce even-aged stands that develop from the flush of seedlings that arises following the fire-induced release of large numbers of seeds on the freshly prepared mineral seedbed.

Fires in lodgepole pine sites tend toward one of two extremes. They may smolder and creep slowly on the soil surface consuming litter and duff, or act as high-intensity, stand-replacing fires. Most are low-intensity fires due to the generally sparse undergrowth and stand growth habit. Cool, moist conditions prevail under a dense closed canopy, and fires that start here usually remain on the ground, smoldering for days. Such smoldering fires have been observed in Yellowstone National Park (Brown, 1975; Despain and Sellers, 1977).

High-intensity fires are most likely to occur where there are concentrations of dead fuels or mixed dead and live fuels, individual trees or groups of trees may torch, and fire can continue to travel through the crowns aided by steep slopes and high winds. Though much less common, high-intensity crown fires account for most of the acres consumed by fire. Summer wildfires may exhibit both types of behavior, depending on the diurnal weather fluctuations. Stand conditions determine the fire potential, and this, in turn is the result of the disturbance history of the site (Brown, 1975).

Reported fire frequencies for lodgepole pine stands vary from twenty-two years in the Bitterroot Valley of Montana (Arno, 1976) to over three hundred years in Yellowstone National Park (Romme, 1982). Chapman (1990) believed that fires may occur as frequently in western Wyoming as they do in the northern Rocky Mountains, but that they may be less detectable because the majority are short-lived and consume relatively little fuel. In most years, the even distribution of annual precipitation, year-round freezing temperatures, and generally low wind velocities tend to limit fire potential in the Teton Wilderness in Wyoming. Fire scars and large areas dominated by lodgepole pine suggest that "periodic, extensive fires" occurred in the Teton Wilderness in the past (Reese, *et al,* 1975). Large fires may occur during dry, windy weather regardless of stand age (Brown, 1975), or fuel type.

Xeric Subalpine Fir and Engelmann Spruce Habitat Types

This fire group contains the bulk of subalpine fir and Engelmann spruce habitat types found on the Forest. Lodgepole pine is the dominant seral species in these forests. Douglas-fir is important in warmer exposures on sites with calcareous soils. Engelmann spruce may be a long-lived seral species, or a climax or co-climax dominant with subalpine fir. Aspen often persists on the periphery of older stands, or it may exist with conifer species in the early to middle stages of succession. While aspen is retained on a site, it has the potential to become a seral dominant after fire (Steele, *et al,* 1983). The understory makeup is variable. Some habitat types may be dominated by shrub growth; in others shrubs may contribute only minor

10 **Serotinous** cones require heat in order to open and release their seeds.

amounts of cover. Seral aspen stands within this fire group often have a species-rich understory.

Historically, fire led to dominance by one or more seral species created by openings in dense stands, and created a mosaic of different ages and species compositions in spruce-fir forests. Where aspen is seral, encroachment of conifers make sites increasingly susceptible to fire as woody fuel and litter succeed succulent forbs. Generally moist conditions and slower rates of fuel accumulation make large fires unlikely except during periods of drought and high wind. Most fires that consume significant acreage in subalpine fir and spruce habitats are high-intensity crown fires during dry, windy conditions that accompany cold fronts (Crane, 1982, Fryer and Johnson, 1988). Lightning starts fewer fires in subalpine habitat types that it does in drier, warmer forests types.

In the northern Rocky Mountains, Arno (1980) estimated fire intervals of fifty to 130 years for subalpine fir habitat types. Lodgepole pine-dominated subalpine fir forests in the Little Firehole River drainage of Yellowstone National Park experienced large (ten acres) stand-replacement fires probably once in three hundred to 350 years (Romme, 1982). Barrett (1994) characterized these forests as having a mixed-severity fire regime with a moderately long fire return interval. He reported a mean fire interval range of twenty-five to 113 years, with an overall mean fire return interval of 97 years on the Forest (Barrett, 1994). In general, sites with aspen or Douglas-fir are represented by the short end of reported fire return intervals for xeric subalpine forests, while sites with lodgepole pine typically report longer fire return intervals.

Mesic Subalpine Fir and Engelmann Spruce Habitat Types

This fire group is composed of subalpine fir and Engelmann spruce habitat types occurring in seasonally moist or wet conditions, or where soils are subirrigated and water tables remain high year-round. Engelmann spruce is a persistent seral or climax species, and Colorado blue spruce may co-dominate on some sites. Lodgepole pine is the other important seral species, while Douglas-fir and whitebark pine are considered minor seral species. Understory vegetation is often lush and diverse. Although shrub cover is often scanty in many of the types, there is usually a diversity of low and tall forbs.

Fires are infrequent due to the moist environment and lush understory. Large woody fuels make up the bulk of the fuel loading, and there may be much rotten material and duff on the forest floor. In colder, high elevation habitat types the proportion of sound to rotten fuel may be greater because of slow decomposition rates. These sites are susceptible to high-intensity burns when droughts occur. Forests may be killed by either surface or crown fires that encroach from surrounding stands. Thin bark and shallow roots make spruce especially susceptible to mortality from hot surface fires that consume the duff and litter layer around trees.

At higher elevations, slower decomposition rates increase the amount of fuels available on a site. Low, smoldering fires of restricted area probably occur most often. This type of surface burn removes one or a small group of trees, rather than an entire stand or drainage. Severe fires occur only during extremely dry conditions, when fires starting on drier sites are of high

intensity and more likely to spread. Crane (1982) estimated of 325 to 335 as the fire return interval for moist spruce sites on the Shoshone National Forest in Wyoming. Romme and Knight (1981) found fire return intervals of 300 to 400 years on the Medicine Bow National Forest in southeastern Wyoming. The mean fire-free interval was estimated to be 130 years for a mesic subalpine fir site in northwestern Montana (Sneck, 1977).

SUMMARY

Over the years numerous people have pointed out the undesirable effects of fire suppression, including Hoxie (1910), Weaver (1943), Gruell (1976), Arno (1980), Wright and Bailey (1982), Pyne (1982), General Accounting Office (1999), and the National Fire Plan (Secretaries of Agriculture and Interior, 2000). The consensus of these authors, and many others, is that fire suppression leads to the accumulation of fuels that when eventually ignited can lead to uncharacteristically large or intense fires. Having acknowledged that it can have adverse effects, overall, fire suppression has caused moderate departure from the historic range of variability on the Caribou National Forest.

The consequence of fire suppression that has been most apparent on the Forest is the increase in the amount of woody biomass, such as standing dead fuels, down woody fuels, ladder fuels. Despite a moderate departure in conditions generally, four trends have emerged: (1) the area of sagebrush with dense canopy cover has increased in some parts of the Forest; (2) an expansion of woodland species; (3) the removal of low-severity fires from mixed-severity regimes; and (4) a decline of quaking aspen.

INSECT AND WILDFIRE RISK ASSESSMENTS

Ecosystems are dynamic; they are continually changing in response to disturbance and succession (Clements, 1916; Tansley, 1935; Gleason, 1939; Egler, 1954; Connell and Slatyer, 1977). The current conditions on the Forest reflect the effects of disturbance, both natural and human-induced, and succession. However, the factor that has had the greatest impact on Forest ecosystems is effective fire suppression. Since 1970, wildfires have affected less than ten percent of the area that is estimated to have burned under historic conditions. The lack of disturbance has caused the Forest to become more homogeneous, with fewer patches caused by disturbance than would be expected under the historic fire regime. This has resulted in increased density and biomass in forested and non-forested vegetation types with associated reduction of herbaceous productivity and diversity; inadequate regeneration of certain species that rely on relatively frequent disturbance, such as quaking aspen; and a shift toward dominance by shade-tolerant forest species with increased standing dead fuels, down woody fuels, and ladder fuels. These changes have increased the risk of insect epidemics and wildfires that are larger and more resistant to control.

To portray the Forest's current vegetation condition in relationship to the susceptibility to insect epidemics, uncharacteristically large wildfires, and the departure from historic fire regimes in the fire groups discussed above, two methods of assessing wildfire hazard are presented in the following discussion. It is important to differentiate between wildfire ***risk*** and wildfire ***hazard***. Risk is a wildfire causative agent, such as lightning or campfires

(Deeming, 1990). Hazard is a subjective rating assigned to vegetation fuel conditions that reflect their susceptibility to ignition, wildfire behavior and severity, and/or difficulty to suppress (Deeming, 1990).

The first method assesses condition classes by Fire Regime (Schmidt, *et al*, 2002). The second method uses a fire hazard rating that estimates the potential for uncharacteristically large wildfires based on the amount of vegetation present on the landscape in a mature and old age structure. Likewise, the insect hazard rating uses also the amount of vegetation present in a mature and old age structure. All these methods are qualitative in nature and are subjective assessments, based on interdisciplinary evaluation of vegetation conditions on the Forest using the most current information available. The assumptions used in this classification are detailed in Appendix B, Issue 3, Disturbances.

Fire Regimes and Condition Classes

A National coarse-scale assessment was conducted to quantify the land condition in the conterminous[11] United States (Schmidt, *et al*, 2002). This assessment estimated the amount of departure from five generalized fire regimes due to fire exclusion or other factors, such as livestock grazing, insects and diseases. This coarse-scale assessment identified changes to key ecosystem components such as species composition, stand structure, tree or shrub stand age, and canopy closure. It characterized the landscape using five Fire Regimes and three Condition Classes. The historical frequency and severity of fire within an ecosystem were used to identify the Fire Regime (Table 3.21), and the degree of departure from the historic reference condition was used to classify the Condition Class (Table 3.23) (Schmidt, *et al*, 2002).

Table 3. 22. Coarse-scale Fire Regime Characteristics.

Fire Regime	Fire Return Interval	Fire Severity
I	0-35 Years	Low
II	0-35 Years	High
III	35-100+ Years	Mixed
IV	35-100+ Years	High
V	> 200 Years	High

The three Condition Classes describe the vegetation composition and structural conditions as they currently exist within a Fire Regime; thus, they serve as generalized wildfire hazard ratings. The risk of losing key ecosystem components due to wildland fire increases from Condition Class 1, which has the lowest risk, to Condition Class 3, which has the highest risk.

[11] **Conterminous** means having a common boundary at some point, contiguous. In this context, meaning the lower 48 states.

Table 3. 23 Coarse-scale Fire Condition Class Descriptions.

Condition Class	Description
1	Fire regimes are within or near their historic range. The risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within their historic range.
2	Fire regimes have been moderately altered from their historic range. The risk of losing key ecosystem components has increased to moderate. Vegetation attributes (species composition and structure) have been moderately altered from their historic range. Fire frequencies have departed (either increased or decreased) from historic frequencies by more than one fire return interval. Moderate changes occur to one or more of the following: fire size, intensity, severity, or landscape patterns.
3	Fire regimes have been significantly altered from their historic range. The risk of losing key ecosystem components is high. Vegetation attributes (species composition and structure) have been significantly altered from their historic range. Fire frequencies have departed (either increased or decreased) from historic frequencies by multiple fire return intervals. Dramatic changes occur to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

The estimated acreage of the five Fire Regimes for the fire groups on the Caribou National Forest is shown in Table 3.*24*. The Forest does not contain any vegetation groups characterized by frequent, low-severity fires (Fire Regime I).

Fire Regime II is a frequent, high-severity regime. The shrubland fire group accounts for all of the acreage in Fire Regime II, and makes up the highest proportion (39%) of the Forest. Approximately 60 percent of the vegetation adjacent to the Forest boundary is shrublands, which include the majority of wildland urban interface areas. These areas fall into this frequent, high-severity fire regime.

Fire Regime III contains the woodlands and most of the coniferous forest types on the Forest. This intermediate-frequency, mixed-severity regime (Fire Regime III) accounts for 26 percent of the Forest.

Fire Regime IV includes quaking aspen and lodgepole pine, and is characterized as an intermediate-frequency, high-severity regime. Fire Regime IV encompasses 34 percent of the Forest.

Less than one percent of the Forest falls into Fire Regime V, only the mesic spruce/fir fire group is included in this infrequent, high-severity fire regime.

The majority of the Forest is made up of mixed-severity and high-severity fire regimes; Fire Regimes II, III, and IV account for over 99 percent of the Forest. Only the shrubland fire group is classified as a frequent fire return interval regime (Fire Regime II), although at 39 percent it covers the largest extent of the Forest. The next largest category (34 percent) is Fire Regime IV, which contains mostly "lethal" or high-severity fires that occur in lodgepole pine and quaking aspen at an intermediate frequency. Most of the conifer forests and the woodlands fall into Fire Regime III; the mixed-severity fire regime encompasses the highest number of vegetation groups and provides for much of the diversity on the Forest.

Table 3. 24 Estimated Acreage of Fire Regimes by Fire Group.

Fire Group[1]	Fire Regime[2]	Acres[3]	Percent of Total Forest Acres
Shrubland	II	404,500	39%
Woodland	III	56,600	5%
Limber Pine	III (I)	4,300	<1%
Xeric Douglas-fir	III (I)	14,300	1%
Mesic Douglas-fir	III (IV, I)	64,200	6%
Quaking Aspen	IV (III)	286,500	28%
Lodgepole Pine	IV (III, I)	66,500	6%
Xeric Spruce/Fir	III (IV, I)	130,200	13%
Mesic Spruce/Fir	V (III, I)	3,700	<1%
Total		1,030,800[4]	100%

1 Fire groups are based on Bradley, *et al*, 1992.
2 The primary fire regime (Schmidt, *et al*, 2002) is listed first with significant secondary fire regimes listed in parentheses.
3 The acreage figures are estimates rounded to the nearest 100 acres, and are subject to revision based on field verification and mapping.
4 The total acres correspond to the total of the upland vegetation on the Forest (excludes rock and riparian vegetation).

Table 3.*25* above summarizes the Condition Classes for each of the Fire Regimes on the Forest. Of primary concern to future forest management is the number of acres in Condition Classes 2 and 3. Acres in these two condition classes place about 83 percent of the Forest at risk of uncharacteristic wildland fire and the loss of key ecosystem components. In particular, about 80 percent of the acres in Fire Regime II are most likely at the greatest cumulative risk to loss of native animal and plant habitats, reduction in air quality due to wildfire smoke, degraded water quality and risks of wildfire degradation to watersheds, and risks to human health and safety as a result of the combination of ecosystem departure and risk of uncharacteristic wildland fire (Schmidt, *et al*, 2002). Fire exclusion, livestock grazing, invasion of exotic species, housing and agriculture development adjacent to the Forest boundary are the primary causes of departure (Schmidt, *et al*, 2002).

While Fire Regime III has been less dramatically affected by human intervention compared to Fire Regime II, more than 80 percent of the Fire Regime III acres are in Condition Classes 2 and 3. These areas are at risk due to the more subtle effects of homogenization and increased woody density (Barrett, 1994; Schmidt, *et al*, 2002). Fire exclusion, livestock grazing, and the establishment of exotic species along roadways are the significant causes of departure.

More than 90 percent of the acres in Fire Regime IV are in Condition Classes 2 and 3, due to fire exclusion or lack of other forms of disturbance in quaking aspen, which make up more than 80 percent of Fire Regime IV. This does not include the 140,000 acres of formerly aspen-dominated communities that have succeeded to conifer-dominated communities (Refer to Aspen Process Paper).

Table 3. 25 Estimated Acreage and Percentage of Fire Regimes and Condition Classes.

Fire Regime[1]	Total Acres[2] in Fire Regimes	Condition Class 1[3]		Condition Class 2[3]		Condition Class 3[3]	
		Acres	Percent	Acres	Percent	Acres	Percent
I	0	0	0%	0	0%	0	0%
II	404,500	80,900	20%	121,400	30%	202,200	50%
III	269,600	49,400	18%	90,200	33%	130,000	48%
IV	353,000	35,300	10%	48,600	14%	269,100	76%
V	3,700	2,600	70%	1,100	30%	0	0%
Total	**1,030,800[4]**	**168,200**	**16%**	**261,300**	**25%**	**601,300**	**58%**

1 Fire regimes are based on Schmidt *et al.* 2002.
2 All acreage figures are estimates rounded to the nearest 100 acres, and are subject to revision based on field verification and mapping. Only the primary fire regime listed in Table 3.*xx* is used to estimate acreage.
3 Condition classes are based on Schmidt *et al,* 2002.
4 The total acres correspond to the total of the upland vegetation on the Forest (excludes rock and riparian vegetation).

Condition Classes provide an estimate of departure from historic fire regimes and the associated risk to ecosystems (Schmidt, *et al*, 2002). Based on Barrett's 1994 fire history study of the Forest, it appears fire frequencies have increased by one or more fire return intervals for all Fire Regimes, except for Fire Regime V. Applying this information to forest structure and composition, approximately 58 percent of the acres on the Forest would be in Condition Class 3 primarily as a result of fire exclusion.

INSECT AND WILDFIRE HAZARDS

The combined effect of all forms of disturbance during the recent past is considerably less than the amount attributed to historic wildfires alone. The lack of disturbance is a consequence of effective fire suppression and relatively modest levels of regeneration harvest and prescribed fire in the past. The changes in vegetation conditions from historic disturbance regimes have led to an increased risk of insect epidemics and uncharacteristically large wildfires. Mortality from insects can lead to increased fuel loads, which in turn, can lead to wildfires that are uncharacteristically large and resistant to control.

The indicators used to estimate vegetation at risk to uncharacteristic disturbance are: (1) Insect Hazard, and (2) Wildfire Hazard. These indicators provide a relative measure of the potential for insect epidemics and uncharacteristically large wildfires. These qualitative ratings were developed by comparing the current amount of vegetation in mature and old age-classes relative to the amount of mature and old age-classes estimated to have occurred under historic disturbance regimes. Separate wildfire hazard ratings were developed for forested and non-forested vegetation. The hazard ratings are directly related to changes in vegetative conditions, including species composition, structure, and density. The percentages of mature and old age-classes[12] of conifer and of aspen were derived from the most recent

[12] **Mature** refers to trees that have attained full development. Ages and sizes of dominant mature trees are those that occur at or above the highest average annual increment of the tree stand's volume growth. Old refers to ages and sizes of trees significantly beyond maturity (UCRB, DEIS, Chapter 3, pg. 29)

GIS vegetation data and are the same used in the Forested Vegetation and Non-forested Vegetation sections of this chapter.

The Forest Pest Management group of the Forest Service provides annual aerial detection surveys for all or a portion of the Forest. These surveys provide broad information on new insect disturbances from year to year. As individual forested vegetation projects are planned and implemented, site visits provide risk information based on the species, age, size, and stand density within a project area. These site visits have validated that mature and old age classes are at higher risk to insect disturbances (Steele, *et al*, 1996; Weatherby and Their, unpublished report, 1993; Schmid and Frye, 1976).

The estimated insect hazard was based on the overall conifer percentage of mature and old age-classes from current GIS data using the same groupings of conifers discussed in the Forested Vegetation Diversity section of this chapter.

Table 3. 26 Forested Vegetation Insect and Wildfire Hazard Ratings.

Forested Vegetation Insect Hazard Rating	Percent of Conifer Acres in Mature/Old Age Class Structure
Low	Less than 50%
Low-Moderate	50-60%
Moderate	60-70%
Moderate-High	70-80%
High	Greater than 80%

Approximately 75 percent of the conifer acres on the Forest are considered to be in a mature/old age class structure. The current insect hazard rating for forested vegetation is considered "Moderate-High." Approximately 60 percent of the conifer and aspen acres on the Forest are considered to be in a mature/old age class structure. The current wildfire hazard rating for forested vegetation is considered "Moderate."

The wildfire hazard rating for non-forested vegetation were estimated based on the following scale that rates the percent of acres in greater than 15 percent canopy cover on a forest-wide scale and shown in Table 3.27.

Table 3. 27 Estimated Non-Forested Vegetation Wildfire Hazard Rating.

Non-Forested Vegetation Wildfire Hazard Rating	Percent of Sagebrush/Mountain Brush Acres in Greater than 15 Percent Canopy Cover
Low	Less than 45%
Low-Moderate	46-50%
Moderate	51-55%
Moderate-High	56-60%
High	Greater than 60%

Approximately 50 percent of the sagebrush acres on the Forest are in greater than 15 percent canopy cover. The current wildfire hazard rating for non-forested vegetation is considered "Low-Moderate."

SUMMARY

The overall picture is similar regardless of which method is used to assess fire and insect hazards in forest vegetation types. Many areas of the Forest have significant departures from the historic range of variability and are at risk to insect epidemics or uncharacteristically large wildfires. The Condition Class evaluation portrays a more dramatic departure than the Wildfire Hazard Ratings method, because it emphasizes historic fire frequencies and missed fire cycles, whereas the Wildfire Hazard rating evaluates mature/old age class structure that is typically associated with higher risk from wildfires.

As a result of fire suppression the amount of woody biomass has increased, both live vegetation and dead plant material, and the Forest has become more homogeneous and less diverse (Barrett 1994). Forest-wide, both the risk of insect epidemics and the risk of uncharacteristically large wildfires are considered "moderate." Over 80 percent of the Forest is in Condition Classes 2 and 3. If this trend of withholding fire, or some other form of disturbance, continues, the risk of insect epidemics and large wildfires is expected to rise.

Forested Vegetation Diversity

Analysis Scale: Forest-wide

Issue Statement:

Forest Plan Alternatives and management direction may affect function and processes of ecological systems related to structure, composition, and patterns of forested and non-forested vegetation.

Indicators

♦**EM.4 Percent of conifer and aspen acres in mature and old age[13] condition in Year 100.**

Baseline indicators: Conifer forested vegetation: 70% - 80%

Aspen forested vegetation: 40% - 50%

♦**EM.5 Percent of conifer and aspen acres in mature and old age condition class in Year 10.**

Baseline indicator: Not applicable

♦**EM.6 Number of decades to reach desired range of future conditions properly by vegetation type.**

Baseline indicator: Not applicable

BACKGROUND TO ISSUE

In the ***Initial Analysis of the Management Situation*** (USDA-FS, 1999), needs for changes in the current management direction were identified for vegetation management. Outside of the rural/wildland interface, where the emphasis is to manage for natural vegetation patterns and processes, management options should consider maintaining properly functioning conditions using management-ignited fire, wildland fire use (WFUs), tree harvesting, tree thinning or other appropriate management tools. Within the rural/wildland interface, properly functioning condition should be maintained through the appropriate use of management-ignited fires, wildland fire use (WFUs), tree harvesting, and tree thinning to maintain open, mature forests, low density mid-seral forests, and appropriate early seral types, primarily quaking aspen and lodgepole pine.

The Caribou National Forest lies within the Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province, according to Bailey's Ecoregion Map of the United States (Bailey, 1995). Both forested and non-forested vegetation cover types occur on the Forest.

Forested vegetation occupies approximately fifty percent of the Forest landbase and is found on rugged island mountain ranges at elevations of approximately 6,000 feet (1,829 m) to

13 **Mature** refers to trees that have attained full development. Ages and sizes of dominant mature trees are those that occur at or above the highest average annual increment of the tree stand's volume growth. **Old** refers to ages and sizes of trees significantly beyond maturity (UCRB, DEIS, Chapter 3, pg. 29)

nearly 10,000 feet (3,048 m). These elevations have cool winter temperatures and short growing seasons. The subalpine zone is the highest vegetation zone and is dominated mainly by subalpine fir and Engelmann spruce. As elevation decreases, the subalpine zone gradually grades into the montane zone of predominantly Douglas-fir. After disturbance, quaking aspen or lodgepole pine initially invade sites in both zones.

Non-forested vegetation sites within the forested area support a variety of species, including grasses, grass-like plants, forb, and shrubs in the understory. They also include natural openings of dry grasses, shrubs, forbs and wet meadows.

Current Conditions

In 1996, the Forest developed a new vegetation inventory, classifying existing vegetative cover types from satellite images. Of the Forest's 1.1 million acres (445,500 ha), approximately 550,000 acres (223,000 ha) support forestland[14]. This excludes about 10,200 acres (4,131 ha) of lands where forested vegetation species are gradually encroaching into mountain brush habitats. Table 3.28 displays acres by cover type for the forestland portion of the classification. The cover types displayed are used to illustrate, in relative terms, the amounts of each cover type present on the Forest. They will not match similar acreage calculations from the 1985 Forest Plan, because different methodologies were used to calculate the acreages, and different groupings of vegetation were used in each classification; they should not be used to estimate changes in each cover type that have occurred over the last fifteen years.

Table 3. 28. Forestland Acres By Cover Type.

Cover Type	Acres	Hectares	Percent of Total Forested Acres
Douglas-fir/Limber pine	143,000	58,000	26%
Lodgepole pine	66,000	27,000	12%
Mixed conifer	61,000	25,000	11%
Subalpine fir/Engelmann spruce	12,000	5,000	2%
Aspen*	158,000	64,000	29%
Aspen/Conifer mix	110,000	44,000	20%
Total	**550,000**	**223,000**	**100%**

*Includes minor amount of maple and willow.

The cover types used in the Forest's vegetative classification differ slightly from those used in the Forest's Subregional Properly Functioning Condition (PFC) Assessment. For the vegetative classification, acres of limber pine, a minor species on the Forest, were combined

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[14] Forestland is defined as land at least 10 percent occupied with forest trees of any size or formerly having has such tree cover and not currently developed for non-forest use (36 CFR 219.3)

with Douglas-fir. A "mixed conifer" type was identified in addition to the subalpine fir/Engelmann spruce cover type, which normally contains more than forty percent Engelmann spruce. The "mixed conifer" type includes subalpine fir, Douglas-fir, lodgepole pine, which is the principal early seral, and aspen, with or without trace amounts of Engelmann spruce. This was done to display the naturally occurring mixed species types, which are major components of the Forest's forestland vegetation, and their wider range of species compositions, structures, and management opportunities.

Structure is used to express the balance of age and size classes of forested vegetation. An adequate recruitment in the type must occur to sustain a range of age classes in order to sustain both the cover type and a variety of wildlife species. **Composition** is an expression of species present. In the case of vegetation, this means recruiting and sustaining early seral species while providing for the diversity of all successional species. **Disturbance regime** includes all known historical disturbances that have affected the ecosystems. The most common factors are lethal and non-lethal fire and insects and disease. **Patterns** are an indication of how ecosystems function among and between each other and include the determination of an ecological type's natural size, shape, distribution, and position on the landscape in association with other types

DOUGLAS-FIR AND LIMBER PINE COVER TYPES

STRUCTURE, COMPOSITION AND PATTERNS

Rocky Mountain Douglas-fir (*Pseudotsuga menziesii, var. glauca*) is widespread throughout the Forest, consisting primarily of moist but also some dry habitat types. At the lower, warmer and drier edge of its zone, it is confined to north slopes and shaded areas and can occur as the singular conifer species, mixed with aspen. At the higher elevations, it grows on the sunny slopes and dry rocky exposures and on some cooler locations as an earlier seral species with subalpine fir (*Abies lasciocarpa*) and Engelmann spruce (*Picea engelmannii*). Associated vegetation ranges from shrub species, such as sagebrush types on warmer, drier low elevation sites between 6,000 feet (2,430 m) and 7,000 feet (2,835 m), to lodgepole pine (*Pinus contorta*), subalpine fir, Engelmann spruce and quaking aspen (*Populus tremuloides*) at cooler and more moist higher elevation sites. Quaking aspen is the dominant early seral species on most Forest sites within this type, quickly occupying sites following disturbance.

Current stand structures are typified by mature and old age classes of Douglas-fir with remnant amounts of quaking aspen and/or lodgepole pine. Few acres are in the seedling/sapling/pole size classes.

Natural succession, in the absence of disturbance and fire suppression, has allowed the development of dense stands of pure Douglas-fir on some sites. Fire regimes in the type were usually non-lethal at frequencies of thirty to fifty years in pre-European settlement time reducing densities of small, understory trees and occasional overstory trees (Barrett, 1994).

Insect populations are currently at endemic[15] levels within the type, following a Forest-wide infestation of Douglas-fir bark beetles (*Dendroctonus pseudotsugae*) in the early 1990s (Forest Pest Management, 2001). An estimated ten percent of forested acres are affected by Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*). On some drier sites where Douglas-fir is pure or predominant, levels of infection are moderate to high affecting the viability of the trees (Hawksworth, *et al*, 1996).

Limber pine is a minor species, usually occurring over 7,000 feet (2.134m). It occupies some of the driest sites capable of supporting trees. Tree form and spacing is highly dependent upon site conditions. Douglas-fir is its most common tree associate. Most stands are in the mature size/age class.

Departures in Structure, Composition and Pattern

The Douglas-fir type has gained considerable acres from the aspen type through natural succession over the past fifty years (Interpretation of 1910-1913 Caribou National Forest Vegetation Cover Maps compared with data from the 1985 Forest Plan, Chapter 2, pages 3-4). Some predominately pure stands of Douglas-fir have become very dense with live and dead stems. Approximately seventy to eighty percent of stands are in mature and old age classes. Several light "thinning" fires have been precluded due to over-grazing and fire suppression on most acres (Barrett, 1994). Most of these stands have not experienced fire in over eighty years, creating fuel buildups and the potential to alter the previous fire regime from frequent light surface fire to long interval fires that produce mixed or high severity burning. These fires will often result in stand replacement burning during wind driven events.

Limber pine reflects composition, disturbance, and patterns that are within the historic range. Structure and age class distribution is weighted toward the mature age class with about eighty percent in the mature and old age classes.

SUCCESSION

Succession is a predictable process of change in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as "seral stages." Seral refers to the development phase of a vegetation community with characteristic structure and plant species composition; typically, young or early seral forest refers to seedlings or sapling growth stages. Mid-seral forest refers to pole or medium-sized sawtimber tree growth stages and late seral refers to old-age stages (UCRB Draft EIS, 1997).

In the Douglas-fir type, the characteristic pre-European settlement fire regime was short return intervals and non-lethal (Barrett, 1994). Most stands were open and park-like, with even-aged grouped stands dominated by old fire resistant trees. Shrubs, understory trees and

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[15] **Endemic** is applied to populations of potentially injurious plants, animals or viruses that are at their normal, balanced level, in contrast to epidemic (SAF).

downed logs were sparse. Aspen, Douglas-fir and lodgepole pine regeneration occurred where the death of overstory trees created openings. Seedlings would occasionally grow fast enough to gain adequate resistance to survive the fire. Fires lethal to the overstory usually occurred in steep or windy areas where the fire would carry into the canopy or on low productivity sites where trees did not grow tall enough between fires to resist flames.

MIXED CONIFER AND LODGEPOLE PINE COVER TYPES

STRUCTURE, COMPOSITION, AND PATTERN

This type occurs as a mixed species forest with lodgepole pine as the dominant early seral species and subalpine fir as the dominant late seral species. It is generally found on north facing slopes at lower elevations and on any aspect at higher elevations. Early seral stands of this type are characterized by lodgepole pine and occasionally aspen. Although lodgepole pine can occur as a persistent seral within the Forest, the species is overwhelmingly "transitional," being a temporary site occupant gradually replaced through natural succession by more shade tolerant conifers. At later successional stages, subalpine fir associated with lodgepole pine, Douglas-fir, and an occasional Engelmann spruce occupy these sites.

In the earlier successional stages of this type, composition is predominately dense lodgepole pine in landscape patterns of one hundred acres or more. Depending on the successional stage and habitat type, mature lodgepole pine overstories have a variably dense component of subalpine fir or Douglas-fir in the understory. Fire intervals historically were highly variable, with mixed severity fires correlated with landform. Those fires that burned hot enough to kill trees changed stand composition from shade-tolerant species, such as subalpine fir, to the shade-intolerant species, lodgepole pine and aspen, resulting in much of the lodgepole pine today (UCRB, 1997). Mature and old lodgepole pine stands have experienced endemic mountain pine beetle outbreaks, which grew into localized epidemics on some sites. Dwarf mistletoe (*Arceuthobium americanum*) is the most common disease, and is present at low to mid levels in most stands. The lodgepole pine cover type has been intensively managed on the forest through harvest from the mid 1980s through the late 1990s. Most of these stands had originated from fires in the early 1900s. Harvest methods, such as clearcutting and seed-tree cutting, replaced many of these stands with young stands of naturally regenerated or planted lodgepole pine. Acres where this species is an early seral that were not disturbed by earlier century fires developed into stand dominated by shade tolerant species, such as subalpine fir or mixed conifer stands of shade tolerant and intolerant species.

Natural succession, in the absence of fire disturbance, results in a mixed species forest where subalpine fir usually emerges as the dominant late seral species, replacing lodgepole pine, aspen, and other less shade tolerant conifers. Approximately seventy to eighty percent of the mixed conifer type has reached this mature/old stage on the Forest. Fuel loading is high as dead lodgepole pine and aspen accumulate on the forest floor, and densities of live shade-tolerant conifers increase. Approximately 10,000 acres of this type have experienced high intensity wildfire in the past two decades, changing the vegetation successional stage on most of these acres from late to early seral.

Departures in Structure, Composition, and Pattern

The mixed conifer type has gained considerable acres from the lodgepole pine and quaking aspen early seral types through natural succession in the absence of fire disturbance over the past fifty years (Interpretation of 1910-1913 Caribou National Forest Vegetation cover maps compared with data from the 1985 Forest Plan, Chapter 2, pages 3 and 4). Approximately seventy to eighty percent of this type is in the mature and old age class. Fuel loading is unprecedented in later successional stands. These stands have missed "thinning" fires that would have removed shade tolerant fir trees over the past one hundred years. Ladder fuels are present in many stands due to the multiple canopy layers composed of shade tolerant and shade intolerant trees and high stand densities. In some areas, harvest has resulted in a fragmented landscape, particularly where harvest units averaged twenty to thirty acres compared to the historical pattern of one hundred acres.

SUCCESSION

Fire variability is high in the mixed conifer type, with lodgepole pine the dominant early seral (Barrett, 1994). These fires reduced fuels, thinned the stand, and killed less fire-tolerant species. The fire regime is often mixed with lethal and non-lethal fires. Severe, high intensity fires change the old multi-layer stands that developed with low intensity fire events to single layer stands of lodgepole pine. Lodgepole pine is a persistent early seral species in some of these stands on gentle terrain, particularly in response to cold air drainage and impoundment. These forests also experience endemic insect and disease occurrences, which occasionally grow into localized epidemics. Slopes above these cold air impoundments exhibit situations where lodgepole pine is gradually replaced by subalpine fir and Douglas-fir (Steele, *et al*, 1983).

SUBALPINE FIR/ENGELMANN SPRUCE COVER TYPE

STRUCTURE, COMPOSITION, AND PATTERN

This type occurs as a mixed species forest with Engelmann spruce the dominant early seral species in association with lodgepole pine, aspen and Douglas-fir. Subalpine fir is the dominant late seral species. The type occurs at elevations generally over 7,500 feet in the Bear River Range.

Fire intervals historically were highly variable, with a predominantly mixed severity fire regime. Few acres of this type have experienced fire in the past one hundred years. Insect populations are currently at endemic levels but mature and old age class stands are increasingly susceptible to spruce bark beetle (*Dendroctonus engelmannii*). Many acres of the type have been managed with selective individual tree harvest in the Bear River Range, reducing their susceptibility to this insect.

Departures in Structure, Composition, and Pattern

Approximately eighty percent of this type is in the mature and old age classes and has missed several "thinning" fires over the past one hundred years. Some of these areas have heavy live and dead fuel buildups and the potential to alter the previous fire regime from frequent light surface fire to long interval fires that produce mixed or high severity burning.

SUCCESSION

Fire regimes in Engelmann spruce-subalpine fir are mixed severity, creating a mixture of lethal and non-lethal effects on the understory and overstory. Again, a relatively high percentage of old multi-layer forest is maintained. These old forests are typically found in cold, wet bottoms or basins where fire either did not burn or burned in a patchy pattern. Disturbances, either by fire, windthrow, insects, or timber harvest, usually create small openings in the canopy, which are occupied by Engelmann spruce, lodgepole pine, and aspen.

QUAKING ASPEN COVER TYPE

STRUCTURE, COMPOSITION, AND PATTERN

Quaking aspen is found on more Forest acres than any other tree species, ranging in elevation from about 5,000 feet (1,524 m) to more than 9,000 feet (2,743 m). Its successional role varies from an early seral species, eventually succeeding to conifer, to a persistently seral species. It can also occur as a climax species, occupying sites below the lower limit of conifers. The type is an early seral on nearly every moist Douglas-fir site on the Forest and many mixed conifer and subalpine fir/Engelmann spruce sites. Aspen stands are weighted heaviest to the mature class; however, a steady loss of all age classes of the type is occurring due to conifer encroachment. Approximately forty to fifty percent of quaking aspen in portions of Idaho, including the Caribou National Forest, have succeeded to other vegetation types, compared to historic conditions, according to the 1996 Intermountain Region's Assessment of Properly Functioning Condition.

The most common disease in the Forest's aspen stands is black leaf spot *(Marssonina populi)*. Although it is not usually fatal, incidence of this disease has gradually increased during the late 1990s.

Departure from Structure, Composition, and Pattern

It is estimated that 150-400 years before present aspen may have occupied up to 425,000 acres on the Caribou National Forest. Approximately 268,000 acres of aspen and aspen/conifer are present on the Forest today, a difference of 140,000 acres (Betz, Process Paper P). The loss is attributed primarily to natural succession of conifers in the absence of disturbance.

The steady loss of aspen to conifers has reduced aspen habitat and the species that depend on the patterns and structures found in functioning aspen woodland. Results of fire regime studies in aspen suggest a wide variability in fire occurrence within the aspen-conifer mosaic. Few acres of the type have experienced fire disturbance in the past eighty years, and fire has not had a significant role in influencing distribution of structural classes and patterns. Subsequently patterns of the type's occurrence and overall size and presence of wildlife corridors have been diminished.

SUCCESSION

Quaking aspen is able to tolerate a wide range of environmental conditions, and its successional role varies from a purely seral to a persistently seral and even climax species. The most apparent climax stands are those that occur beyond the lower limits of conifers, frequently occupying concave slopes of low hills on the Forest. Within the zone of coniferous forest, aspen stands tend to be more clearly seral to one or more coniferous species.

Fire plays a significant role in maintaining and regenerating aspen on these sites (Bradley, *et al*, 1992). A short-lived herb stage usually follows a stand-replacement fire, and aspen resprouting generally begins within the first growing season following fire or other disturbance. Conifers may reclaim these sites rapidly, but in some areas conifer establishment may be retarded by a lush development of seral forb and graminoids (Steele, *et al*, 1983). If fire does not occur in this stage, a mixed conifer/aspen stand develops with conifers sharing the overstory and the understory, or a near pure aspen stand may develop with or without conifers in the understory.

Table 3. 29. Comparison of Existing Conditions and Desired Range of Future Conditions

Forested Vegetation Cover Type	Existing Percent of Total Acres in Old and Mature[1]	Desired, Based on Ecosystem Function and Sustainability (UCRB, 1997) Percent of Total Acres in Old and Mature[1]
Douglas-fir/Limber pine	70-80%	30-40%
Engelmann spruce/ Subalpine fir	80%	30-40%
Mixed conifer including Lodgepole pine	70-80%	30-40%
Quaking Aspen	40-50%	20-40%

1 Mature refers to trees that have attained full development. Ages and sizes of dominant mature trees are those that occur at or above the highest average annual increment of the tree stand's volume growth. Old refers to ages and sizes of trees significantly beyond maturity (UCRB, DEIS, Chapter 3, pg. 29).

Non-forested Vegetation Diversity

Analysis
Scale:
Forest-wide

Issue:

Forest Plan Alternatives and management direction may affect function and processes of ecological systems related to structure, composition, and patterns of forested and non-forested vegetation.

Indicators:

♦**EM.7 Percent of non-forested acres in greater than 15 percent canopy cover density condition classes in year 10 and long-term, compared to the historical range of variability**

Baseline indicator: Currently 50 percent of sagebrush acres are in greater than15 percent canopy cover density condition class

♦**EM.8 Number of decades to reach historic range of variability by vegetation type**

Baseline indicator: 0.7 decades

BACKGROUND TO ISSUE

The evolution of non-forested ecosystems has been shaped largely by climate and disturbance. Periodic drought explains the presence of drought-resistant vegetation on ranges. These are dynamic systems that function and evolve in concert with all environmental factors, including climate, organisms, and geological influences, and eventually come to a natural dynamic equilibrium with these environmental factors. Today the environmental impacts on ecosystem function include the activities of humans. The fluctuating natural equilibrium that once existed before humans appeared no longer exists as a factor in the ecosystem. In this equilibrium, humans are active participants in the management of these altered ecosystems (Engle, 1985).

Non-forested ecosystems are unique, and considerable differences exist between the various non-forested vegetation cover types. Each must be managed to maintain its own unique attributes. Non-forested ecosystems differ greatly in their extent, their structural and functional characteristics, patterns of community succession, and their stability and resiliency under disturbance, including their sensitivity to invasion by undesirable non-native species. The differences among non-forested ecosystems highlight different potentials for providing products and values for society. The more arid non-forested ecosystems, which may be less stable and less resilient under livestock grazing than non-forested ecosystems in more humid regions, are also much lower in production potential (Engle, 1985).

Current Conditions

The affected area for direct, indirect, and cumulative effects to vegetation structure, composition, disturbances, and patterns is 1,042,200 acres of National Forest System (NFS) lands within the Caribou National Forest boundaries administered by the Caribou-Targhee National Forest.

A satellite image classification analysis of vegetation on the Forest in 2000 identified the number of acres in each of the non-forested/woodland vegetation type groupings and cover types shown in Table 3.30. The non-forested and woodland vegetation type groupings displayed in the table are used to illustrate, in relative terms, the amount of each vegetation type grouping or cover type present on the Forest. The acres in the table will not match similar acreage calculations from the 1985 Forest Plan because of different methodologies used to calculate the acres and different groupings of vegetation in each classification. The acres in the table below should not be used to estimate changes in each vegetation type that have occurred over the last fifteen years.

Table 3. 30. Approximate Acres of Non-Forested/Woodland Vegetation Types on the Caribou NF.

Vegetation Type Grouping Classification	Acres	Hectares	% Total Non-forested Acres
Sagebrush/Mountain shrub[1]	404,500	163,700	86%
Mountain mahogany	20,000	8,100	4%
Maple[2]	24,700	10,000	5%
Juniper	11,900	4,800	2%
Rock (including mines)	7,900	3,200	2%
Water	200	80	Less than 1%
Total	**469,200**	**189,880**	**100%**

1 The acres in mountain shrub include all acres the analysis could not identify in a specific cover type. Mountain shrub is characterized by a mixed composition of several shrub species including sagebrush, chokecherry, serviceberry, rose, and snowbrush. This grouping also includes all sagebrush species found on the Forest.

2 Maple vegetation cover type is composed generally of bigtooth maple and may have aspen included.

A wide variety of non-forested vegetation cover types occur on the Forest. The types range from open sagebrush-grasslands to wet meadows and riparian areas and from drier juniper and mountain mahogany sites to moist bigtooth maple stands found in canyon bottoms, foothills, and drainage-ways. Factors such as climate, soils, aspect, elevation, and past disturbance determine the type of vegetation that exists on a site, which may differ from the potential natural vegetation or climax community. Climax community is defined as the culminating stage in plant succession for a given environment that develops and perpetuates itself in the absence of disturbance (Steele, *et al*, 1983).

SAGEBRUSH/MOUNTAIN SHRUB VEGETATION GROUP

Analysis Scale: Forest-wide, Subsection

On the Caribou National Forest, sagebrush and mountain shrub ecosystems are mapped at a very broad scale as "sagebrush steppe" potential natural vegetation type (A.W. Kuchler, 1964). This vegetation type covers the northern portion of the Intermountain Region where sagebrush is co-dominant with perennial bunchgrasses. Approximately forty percent of the 1,042,200 acres of National Forest System lands within the Caribou National Forest are classified in the sagebrush/mountain shrub vegetation type grouping. Woodland and other shrublands cover an estimated five percent of the Forest. The remaining fifty-five percent is classified as forested vegetation.

GENERAL STRUCTURE, COMPOSITION AND PATTERNS

The sagebrush/mountain shrub vegetation grouping occupies approximately 404,500 acres forest-wide and is dominated by the presence of big sagebrush (*Artemisia tridentata spp*). At least eleven sagebrush taxa are represented. In sagebrush cover types other shrubs may be present; however, sagebrush is the characteristic shrub and dominates the overstory in later seral stages. Vegetation cover types that have over five percent chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier alnifolia*), rose (*Rosa spp.*), or snowbrush (*Ceanothus velutinus*) in combination or alone, are considered mountain shrub cover types that have been included with the sagebrush cover types for purposes of analysis. Mountain big sagebrush (*Artemisia tridentata, spp. vaseyana, var. pauciflora*), subalpine big sagebrush (*Artemisia tridentata, spp. spiciformis*), and Vasey sagebrush (*Artemisia tridentata, spp. vaseyana, var. vaseyana*) are considered to be the nucleus of the sagebrush cover types on the Forest. Other sagebrush cover types, though distinct in their ecology, have limited acreages forest-wide. Structure, composition, and patterns of this vegetation grouping are a product of site potential as it is influenced by disturbance (Hironaka, *et al*, 1983; Shiflet, 1994; USDA-FS, 1997).

Sagebrush structure relates to canopy cover density and is important to many aspects of forest management. For some upland game bird species, it is important for breeding, nesting and brood-rearing habitat. For ecosystem biodiversity, processes and functions, it is important to maintain a balanced range of sagebrush canopy cover densities for ecological diversity. Density of various sagebrush species may also have an affect on production of the herbaceous understory, because of plant competition, which may affect wildlife, livestock use, forage production, and availability (Sturges, 1975; Winward, 1991; Bedunah, *et al*, 1995). Ecosystems that have about 40 percent of the area with 15 percent canopy cover density are considered to be within the historic range of variability (USDA-FS, 1996).

The composition of the sagebrush/mountain shrub vegetation group should display a balance between the shrub overstory and the herbaceous understory. The associated understory consists of an herbaceous layer of perennial and annual grasses and forbs in varying amounts. Species composition of the understory is strongly influenced by physical and chemical soil characteristics and by disturbances, such as grazing. Both grazing intensity and type of grazing animal affect the species composition (Shiflet, 1994). Some grass species commonly associated with the sagebrush/mountain shrub vegetation type are Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa*

secunda), mountain bromegrass (*Bromus carinatus*), and slender wheatgrass (*Agropyron trachycaulum*) (T.N. Shiflet (ed.), 1994). Sagebrush-grass habitat types found on the Forest are described in ***Sagebrush-Grass Habitat Types of Southern Idaho*** (M. Hironaka, *et al*, 1983). This document includes a comprehensive list of shrubs, grasses, grass-like plants, and forbs that occur in these habitat types. Further information on understory species is presented in the "Livestock Grazing" section of this chapter.

Areas that have been invaded by annual grasses, such as cheatgrass (*Bromus tectorum*) experience an increased fire frequency (Welch, 2000). Many sagebrush ecosystems at lower elevations in southern Idaho have been invaded, but very few acres on the Forest have this condition. Composition of the understory in sagebrush/mountain shrub ecosystems on the Forest is predominantly perennial grasses and forbs with about 75 to 80 percent ground cover (USDA-FS, 1997).

Patterns are an indication of how ecosystems function among and between themselves and are discussed in terms of size, shape, age classes, distribution, and juxtaposition in and adjacent to each ecosystem (USDA-FS, 1996). Occupancy of a site by the various sagebrush types is related primarily to disturbance, moisture, temperature, and soil development among other edaphic[16] and climatic characteristics. The various sagebrush types form a mosaic across the landscape with other vegetation types (Shiflet, 1994; Hironaka, *et al*, 1983; Garrison, *et al,* 1977). Because of the relatively high productivity potential, the sagebrush/mountain shrub vegetation group constitutes an important resource for livestock, wildlife, watershed values, and a wide variety of recreational experiences (Blaisdell, *et al*, 1982).

Departures In Conditions On The Caribou National Forest

The area occupied by the sagebrush/mountain shrub vegetation group has been diminished due to encroachment from other vegetation types. Some areas have been invaded by other vegetation cover types such as Douglas-fir (*Psuedosuga menzesii*) and bigtooth maple (*Acer grandidentatum*) as a result of fire suppression.

The overstory has become more vigorous and dense, and the understory composition has shifted to less desirable species, including annuals and introduced species in limited areas. (CL) This change in overstory/understory composition and structure has resulted in decreased watershed stability on many of these sites (See PFC Assessment, Caribou National Forest and Surrounding Areas, 1997).

Sagebrush canopy cover has a direct relationship to herbaceous understory production and seedling recruitment. As sagebrush becomes established in dense stands, production and re-establishment of grasses and forbs are reduced. A variety of factors may contribute to this reduction, including competition for light, water, nutrients, and space. Literature references suggests that when canopy cover on mountain big sagebrush sites approach twelve to twenty percent (depending on the sagebrush species), herbaceous production is restricted, and these sites are essentially closed to recruitment of new herbaceous seedlings (Winward, 1991;

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16 **Edaphic** means of or relating to the soil or influenced by factors in the soil (Webster's).

Bedunah, 1995; Sturges, 1975). Laycock, *et al,* (1994) reported that once sagebrush becomes dense with reduced understory, it could dominate a site for long periods of time with little change in range condition. These studies also suggest other shrub-dominated vegetation types react similar to the sagebrush-grass type. Other studies have found that when big sagebrush canopy cover density is reduced, an increase in herbaceous production occurs (Britton, *et al*, 1978; Blaisdell, *et al*, 1982).

In a review of the literature, Peterson (1995) reported that after treating some sagebrush sites with fire, an initial increase in herbaceous production resulted in a net decrease after eleven years of recovery. This information implies that results of treatments vary, depending upon the sagebrush species treated and ecological and climatic factors. As herbaceous understory species decline, the fine-fuel component necessary to carry fire into the sagebrush canopy is lost (Young, *et al*, 1978). Sagebrush-grass ecosystems in southeast Idaho and western Wyoming evolved with a natural fire return interval of twenty to forty-five years (Barrett, 1994; Houston, 1973; Blaisdell, *et al*, 1982; Gruell, 1985; Williams, 1995; Wright, *et al*, 1979). Factors, including loss of the understory component, grazing, and fire suppression, have caused stagnant conditions on many sagebrush sites where natural fire regimes have been altered (Winward, 1991; Tausch, *et al*, 1993).

Forest-wide, the ecological status of the sagebrush/mountain shrub vegetation group occurs in various canopy cover densities, and for purposes of analysis, have been broken into two categories: 1) less than 15 percent canopy cover density class; and 2) greater than 15 percent canopy cover density class. This breakpoint between canopy cover densities was used because sagebrush canopy cover densities between 12 percent and 20 percent begin to restrict the herbaceous (forbs and grasses) understory as canopy cover density increases (Winward, 1991.

Mountain shrub types are mostly in dense canopy cover as evidenced by abundant dead material in the canopies, and many stands are becoming decadent, especially in the serviceberry type. Some chokecherry stands are affected by black knot disease (*Dibotryon morbosum*) and few young plants occur in the understory (USDA-FS, 1997).

The Upper Columbia River Basin Draft EIS assessed this vegetation group at a broad scale and determined that the primary cause of departure from historical succession was related to grazing, changes in fire regimes due to suppression, and invasions of undesirable forb and grass species. The results have been lower productivity, higher probability of severe or catastrophic events, and lower similarity to the temporal, spatial, and habitat diversity of the native system (UCRB Draft EIS, 1997).

SUCCESSION

Succession is defined as "the progressive changes in plant communities toward climax, or with qualification, may refer to progressive changes in a direction other than climax" (Steele, *et al*, 1983). The Forest Service will use the term succession to mean the directional structure and composition change in an ecosystem as the available biota modify and respond to changes in the environment including disturbances.

Current and past fire suppression activities have allowed overstory succession in the sagebrush/mountain shrub vegetation group to progress relatively uninhibited. The rate of return to pre-burn conditions is highly variable after lethal fire for mountain big sagebrush stands to achieve pre-burn conditions. The rate of recovery is largely dependent on grazing practices and undefined weather variables that favor sagebrush seedling survival and establishment (Harniss, *et al*, 1973). The literature suggests the rate of recovery ranges from as little as fifteen years to more than thirty years to achieve full recovery (Bunting, *et al*, 1987; Frass, *et al*, 1992; Harniss and Murray, 1973; Sturges, 1975; Bushey, 1986; and Walhof, 1997).

In southeast Idaho, it is estimated that it takes approximately twenty to thirty years for sagebrush sites at 0-5 percent canopy cover density to reach greater than 15 percent canopy cover density (Blaisdell, *et al*, 1982; Project records on file). The range varies with climatic factors, edaphic factors, and plant species. If left untreated, it is assumed all existing sagebrush acres in the less than15 percent canopy cover density class, capable of achieving canopy cover densities greater than 15 percent, would move into the greater than 15 percent canopy cover density class over a twenty to thirty year period on the Caribou National Forest.

Because of this relatively short successional cycle, the sagebrush cover type provides the greatest opportunity for vegetation treatments in non-forested vegetation where it is found to be ecologically sound. The 1985 Forest Plan provides for approximately 13,000 acres of treatment annually. These treatments were designed for wildlife habitat improvement and range vegetation improvement and occurred mostly in the sagebrush/grass cover types, although mountain shrub types also may have benefited from treatments. Because of funding, weather conditions, fire restrictions, and other uncontrollable factors, these goals have not been achieved in the past. In the last ten years, approximately 21,300 acres have been treated with fire. Most of these acres were treated on the Montpelier Ranger District.

Estimates vary on the existing canopy cover density class distribution of sagebrush/mountain shrub vegetation. The Forest PFC assessment estimated that more than forty percent of sagebrush acres are in greater than fifteen percent canopy cover densities. Estimates from site data collected in the 1960's show more than fifty percent of the sagebrush/mountain shrub acres had canopy cover densities greater than fifteen percent as measured by line intercept data.

Today, it is estimated that approximately 45 to 55 percent of the sagebrush/mountain shrub acres have canopy cover greater than fifteen percent density. It is also estimated that approximately 15 percent of the area occupied by sagebrush on the Forest will never achieve more than fifteen percent canopy cover, because of limiting soil conditions, wind-swept ridges, or site conditions and species characteristics (growth form) that prohibit dense canopy cover. The remaining thirty to forty percent of the sagebrush/mountain shrub acres have potential to achieve greater than fifteen percent canopy cover density but are currently in less than fifteen percent canopy cover density (pers. comm., Winward, 2001).

Table 3. 31. Existing Acres of Sagebrush/Mountain Shrub Cover Types by Subsection (USDA-FS, 1997) on the Forest.

Subsection Name	Total Acres	Percent of Total Acres
Basin and Range	103,916	25.7%
Bear River Karst	43,299	10.5%
Cache Valley Range	15,492	3.8%
Caribou Range	79,026	19.5%
Portneuf Uplands	35,056	8.6%
Preuss Ridges and Hills	62,589	15.5%
Webster Ridges and Valleys	65,162	16.1%
Totals	404,540	100%

Table 3.32. Existing Acres in Greater Than 15 Percent canopy Cover Density Condition Class for the Non-forested Vegetation Cover Types.

(Source: Initial Analysis of the Management Situation (AMS).

	Existing Condition	
Non-Forested Vegetation Cover Type	**Estimated Acres in Greater than 15 Percent Canopy Cover**	**Percent of Total Acres in Greater Than 15 Percent Canopy Cover**
Sagebrush/Mountain shrub	182,000 – 222,500	45-55%

TALL FORB COVER TYPE

The tall forb cover type was not delineated in the Forest vegetation classification due to its minor extent. The actual extent of this type has not been determined on the Forest. The indicators for the historic range of variability in the Tall Forb cover type at the subregional assessment scale are defined in terms of structure, composition, patterns, and disturbances:

- Tall Forb types have a dominance of tall forb components with 50 percent or more composed of tall forb species.
- Patterns of vegetation should occur within historical ranges.
- Disturbances (fire) should be within historical ranges with demonstrated stable or upward trend in tall forb indicator species (USDA-FS, 1996).

STRUCTURE, COMPOSITION, AND PATTERNS

Analysis Scale: Forest-wide

This non-forested vegetation cover type is characterized by a vast array of colorful, luxuriant, rather tall, mesic forbs, without any one species dominating. Tall forb sites are found on all aspects and slope gradients where soils are deep and soil moisture is adequate for nearly season-long plant growth. It is generally found at relatively high elevations of 6,300 feet to 9,900 feet where precipitation is between thirty and forty inches. The Tall Forb cover type occurs near springs, along streams, in small forest openings and in larger open parklands within the Douglas-fir and spruce-fir zones on the Forest where soil moisture is adequate for

nearly season-long plant growth (Shiflet, 1994; Winward, 1998). It is most prominent where there is a late summer flush of precipitation that coincides with the prime flowering period. This cover type is found from the Utah-Idaho border, throughout the Bear River Range, northeast on the Gannett Hills, and along the Idaho-Wyoming border in the Preuss, Aspen, and Caribou Ranges (USDA-FS, 1997). (Refer to page 4-51 in the ***Initial Analysis of the Management Situation*** (1999) for a list of plant species most commonly found on tall forb sites.)

Departures in Conditions on the Caribou National Forest

The tall forb cover type was considered prime grazing lands at the turn of the century, especially for the many bands of sheep that used the Forest. As the forbs were eaten, they were replaced with lower growing, more xeric[17] species. On the Forest, this type covered approximately 20,000 to 30,000 acres. In the most severely grazed areas, tall forb sites were prime candidates for vegetation management treatments to increase forage production. Some of these sites were plowed and seeded or the invading brush species were sprayed, and then the site was seeded with introduced grass species. Many of these rehabilitation efforts failed for reasons still not fully understood. Today, annual tarweed (*Madia glomerata*) commonly occurs on these sites (about 3,000 acres). Extensive areas of this type are currently in an early seral stage because of past disturbances, such as grazing, and/or interruption of the historic fire regime. For areas that have experienced substantial soil loss, return to original condition is expected to take many years, if it is even possible. Historic intensive grazing by sheep and cattle has caused a reduction or loss in much of the structure and composition of this cover type in some areas, such as Franklin Basin and Church Hollow.

These departures have resulted in a shift from mesic[18] to xeric plant species. A pronounced increase in ephemeral species has occurred on these sites. Tarweed has become prominent on many disturbed sites, such as Egan Basin; however, indicators, such as geranium, show a positive successional trend toward the tall forb cover type on some disturbed sites. On other sites, mulesear (*Wyethia amplaxicaulis*), California false-hellebore (*Veratrum califoricum*), or western coneflower (*Rudbeckia occidentalis*) have become dominant. Repeated site disturbance on much of this type has resulted in an increase in bare ground, accompanied by accelerated soil erosion and loss of topsoil. These physical alterations have adversely affected the hydrologic function and site productivity on some of the tall forb sites on the Forest, such as those found in Franklin and Egan Basins and Diamond Flat.

Although this cover type is not extensive across the forest, it is important for biological diversity. Priority should be placed on maintaining the historic range of variability on existing sites and restoring sites that have the potential and capability to support tall forb plant communities. Tall forb sites should have a dominant tall forb component with fifty percent or more of the vegetation community composed of tall forb species. Minimum ground cover should be seventy-five to ninety percent leading into the winter season.

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[17] **Xeric** sites are characterized by conditions of scant moisture supplies.

[18] **Mesic** sites are characterized by moist conditions, neither very wet nor very dry.

Many areas on the Forest that historically supported tall forb vegetation communities have less than fifty percent of the vegetation community composed of tall forb species, and the ground cover ranges between forty and sixty percent (see PFC Assessment, Caribou National Forest and Surrounding Areas, 1997; USDA-FS, 1997). However, the Forest has many tall forb sites that are in satisfactory condition and trending toward site potential (Winward, 1998). Past treatments on this cover type over the last ten years have been experimental. Small patches of less than five acres have been fenced, plowed, and seeded with little success. The Rocky Mountain Research Station Shrub Sciences Lab is currently conducting experiments on this cover type in Franklin Basin. Future treatments will be applied adaptively as research discovers more effective ways to restore and improve tall forb sites.

Tarweed (*Madia glomerata*) has invaded approximately 3,000 acres on the Forest, and mulesear (*Wyethia amplexicaulis*) invades 1,300 acres. All of these sites are not considered tall forb plant communities.

Table 3. 33. Existing Conditions Compared with Desired Range of Future Conditions on Tall Forb Sites.

Non-Forested Vegetation Cover Type	Existing Condition		Desired Range of Future Conditions	
	Composition of Dominance by Tall Forb	**Percent Ground Cover**	**Composition of Dominance by Tall Forb**	**Percent Ground Cover**
Tall Forb	Less than 50%	40% - 60%	Greater than 50%	75% - 90%

WOODLAND COVER TYPES

Woodland cover types, such as juniper, maple, and mountain mahogany, are not extensive in terms of total areas but they are widespread across the Forest. Rocky Mountain and Utah juniper are found in the juniper woodland cover type, and curlleaf mountain mahogany is the species generally found in the mountain mahogany cover type. Because of fire suppression, these cover types have expanded outside their natural range and have invaded into sagebrush, mountain shrub, and timber cover types. Departure from historic extent is considered high for the juniper cover type and moderate for the mountain mahogany cover type. Analysis of these cover types will be conducted at the site-specific level to determine management objectives and treatments. The same applies for the maple cover type.

Issue 4

Livestock Grazing

Analysis **Scale:**

Issue Statement:

Forest Plan Alternatives and management direction may affect rangeland resources, including lands considered suitable for livestock grazing and the level of livestock grazing (Animal Unit Months (AUMs)) authorized under permit for the Forest.

Issue Indicators:

♦**LG.1 Estimated suitable rangeland acres on the Forest.**

Baseline Indicator: 469,000 acres suitable for cattle
719,000 acres suitable for sheep (includes cattle acres)

♦**LG.2 Potential Forage Production for livestock on Suitable Acres**

Baseline Indicator: 420 million pounds (213,600 AMs) of forage available on suitable cattle range
625 million pounds (1,640,600 AMs) of forage available on suitable sheep range

♦**LG.3 Change in Actual Use based on Current Management**

Baseline Indicator: 71,707 Animal Unit Months (AUMs) of cattle permitted
37,441 Animal Unit Months (AUMs) of sheep permitted

♦**LG.4 Vegetation response to grazing**

Baseline Indicator: Current condition and trends (satisfactory or unsatisfactory on Forest).

BACKGROUND TO ISSUE

Livestock grazing has been an historic and traditional use of the Caribou National Forest. Livestock forage is an important Forest product, particularly to livestock permittees and local communities in southeast Idaho. Many permittees use forage produced on the Forest to meet part of their year-round grazing needs. Grazing on National Forest system lands is authorized by Congress and is a significant use of the Forest. Some of the laws, regulations, and policies that authorize use and/or grazing include the Organic Administration Act of 1897, the Multiple-Use Sustained-Yield Act of 1960, the Forest and Rangeland Renewable Resources Planning Act of 1974, and the Public Rangelands Improvement Act of 1978.

A "Need for Change" related to rangeland resources and livestock grazing was identified in the ***Initial Analysis of the Management Situation, 1999***. Two primary needs were identified:

1) A modification of current management direction for livestock use of riparian areas to reflect current research and Forest observations; and

2) Consideration of new information regarding the proper functioning condition of rangelands, including both uplands and riparian areas.

New information related to the physical and biophysical impacts of livestock grazing on riparian and aquatic ecosystems has become available since the approval of the 1985 Forest Plan. In addition, the current scientific understanding embodied in the Interior Columbia River Basin Scientific Assessment (ICRB, 1996) and interim strategies for managing watersheds producing native fish (USDA-FS, INFISH, 1995) have required a more critical look at grazing use standards. Implementation of information associated with livestock grazing utilization and stubble height standards may affect the level of grazing (AUMs) on the Forest.

LIVESTOCK PERMIT ADMINISTRATION

In order to fully understand livestock grazing effects, it is important to understand the hierarchy of grazing direction. The National Forest Management Act requires that Forest's assess the capability of rangelands to support livestock grazing and address the suitability of that practice on areas of the Forest (1982 regulations at 36 CFR 219.20). The 1982 implementing regulations of NFMA also require that National Forests determine rangeland conditions and trends during the planning process. These determinations and assessments are discussed later in this section and in Appendix B in the Livestock Grazing analysis.

After determining capability, suitability, and conditions in the planning process, these must be implemented on a site-specific level. Because Forest Plans are a guiding document, rather than a project decision, a two-stage decision making process is used in order to comply with other environmental regulations.

In range management, this is generally done during the Allotment Management Plan (AMP) level. These AMPs, authorized by the Federal Land Policy Management Act and the Public Rangeland Improvement Act, are a long-term plan of how each allotment will be managed to achieve desired future conditions and goals from the Forest Plan and those developed at the site-specific level during the AMP process. AMPs include livestock rotation schedules, utilization requirements, structural and non-structural improvements planned, maintenance standards, tentative grazing capacities, etc. On the Forest, AMPs are being updated according to the schedule submitted to Congress for compliance with Section 504(a) of the Recission Act (PL 104-19) of 1995. (FSH 2209.21, Chapter 14)

Once a Forest Plan is final, livestock grazing permits are modified to include any new grazing standards in the Revised Forest Plan. If the Revised Forest Plan provides for the development of more site-specific standards over time, rangeland administrators would determine the site-specific use levels and parameters for the riparian and upland areas in each allotment. These more site-specific standards replace the default standards in the Permit from the Revised Forest Plan. These site-specific standards would also be included in the Annual Operating Instructions (AOI) and AMP updates as they are completed. The AOI is a set of instructions issued to the livestock permittees before each grazing season on how they are to manage their livestock while on the National Forest. AOIs include approximate numbers and rotation dates for grazing throughout the season. These numbers and dates,

however, are simply a starting point (see discussion below). The AOIs are also incorporated into the Grazing Permit making them a binding term of the permit.

Once all the standards and guidelines have been established, each allotment must be administered to meet those standards and guidelines. If the standards are appropriate, the desired future conditions and goals from the Revised Forest Plan and AMPs should be met. **Permit administration is the key to successful livestock grazing on National Forest System lands.** When livestock use standards have been met on a particular unit of land, the livestock must move to the next unit or leave the Forest if they are at the end of their rotation. This action is taken regardless of the scheduled move dates in the AOI or the numbers and season on the face of the permit.

Moving livestock based on use levels, such as stubble height, bank disturbance, percent utilization of the vegetation, or some other parameter, instead of scheduled dates, insures that resource needs are met, regardless of annual environmental variation. It also allows flexibility for Forest Service managers and permittees to meet desired future conditions. In a dry year where forage production levels are low, livestock will move through the allotments much faster than scheduled. This results in a de facto reduction of livestock grazing capacity. For instance, during the summer of 2001, permittees removed their livestock from the Forest up to two months earlier than scheduled in order to meet current use standards. This resulted in a reduction of ten to twenty percent of the animal unit months (AUMs) permitted to graze. Thus, while permitted numbers and seasons (AUMs) stayed the same, the actual use allowed on the Forest was much lower due to reduced forage conditions as a result of drought. Actual use can fluctuate for a variety of reasons, including the resolution of conflicts with other resources such as recreation, wildlife, or timber regeneration. By its very nature, the livestock grazing permit is a flexible, but powerful, tool for ensuring proper management of livestock grazing on National Forest System lands.

To better manage livestock, structural improvements have been constructed across the Forest. Grazing permittees, in cooperation with the Forest Service, have shared equally in the construction of new improvements. The Forest Service portion of the funding for these projects usually comes from funds generated from grazing receipts and is usually in the form of materials and supplies. The permittees' portion usually comes from labor, equipment, additional supplies, and actual money deposited to accounts for contracting the work.

Existing improvements include approximately 482 miles of fence, 370 troughs, 733 stock ponds, 51 miles of pipeline, 5 wells, and 22 corrals. Livestock grazing permittees maintain all of the structural improvements.

History Of Livestock Grazing

The first cattle in eastern Idaho were brought to the area in the 1830s. With the increased use of the Oregon Trail, thousands of livestock were herded along with the settlers (Valora, 1996). Fort Hall became an oasis for travelers and their livestock as a hub for the many trails going in various directions and a trading post for healthy livestock, as sick and weary stock came off the trail. This convenient location provided the beginning of the Idaho cattle industry. Some of the livestock were on their way to the Bitterroot Valley, to northern

Wyoming, or to the gold mines of Montana. Later, many herds came through with settlers on the way to California, Oregon, and Washington. The Lander Trail was surveyed as a route with abundant grass after the forage had been depleted along the original Oregon Trail. By 1859 conflict arose with the Bannock Indians over the use of the grass on the Lander Trail. Throughout the 1860s this area continued to serve as a seasonal pasture and stock driveway.

As the Mormons settled in Utah, southern Idaho began to grow in the early 1860s, when Mormon pioneers moved north as Utah became crowded. By 1875, sheep started moving into Idaho for summer grazing from Utah. The mountains out of Malad were "...renowned for their range grazing." Also, in the 1870s and 1880s Oregon and Washington became crowded, and Idaho became the trail for livestock moving east to markets in larger population centers. As western ranges became full with resident herds, others were forced to move eastward for pastureland. Herds crossing eastward in southern Idaho generally crossed the area that is now part of the Caribou National Forest. Transient cattle were held in eastern Idaho to winter over on the wintertime feed of bunchgrasses and white sage along the Snake River. In hard winters, livestock losses were high, until supplemental feeding became routine. Many of the first ranchers got their start by rounding up stray and crippled livestock from the trail drives. The ranges of Idaho were considered fully stocked by 1875. By the early 1880s cattle trailing numbers dropped off, as forage declined and railroads provided better and quicker access (Valora, 1996). The late 1880's experienced a decrease in rangeland productivity, fueled partially by drought but mainly by the huge numbers of grazing animals (Spaeth, *et al*, 1996).

In what is now the Westside District, Basque herders brought in huge numbers of sheep, which peaked between 1895 and 1905. Early estimates suggest more than 600,000 head of sheep in Oneida County trailed back and forth from the summer mountain ranges to the desert winter ranges. "The range began to depreciate between 1905 and 1910" (Valora, 1996).

On the current Montpelier and Soda Springs Districts, cattle and horses had been grazing since the 1860s when settlers brought them in. Transient sheep herds used the mountains and were overrunning the territory by 1883. Around 1905 an influx of sheep occurred and they dominated the use of the range prior to the establishment of the Caribou National Forest. Livestock was put on the range as soon as the snow melted off in the spring and not brought off until late fall.

Permitted Livestock Numbers

The Forest Reserves Act of 1891 enabled forests to be withdrawn from the public domain and the Organic Act of 1897 vested authority in the Department of the Interior to regulate and control the use of these reserved lands. This authority was transferred to the Department of Agriculture in 1905 and the Forest Service when the agency was created. By 1907 the Forest Service had established a system of range regulation that included permits, limits on herd size, grazing seasons, allotments and grazing fees. The Agency's right to implement grazing regulations was upheld in 1911 by the U.S. Supreme Court in *United States vs. Grimaud* (Spaeth, *et al*, 1996).

Applications were made in 1907 for 740,000 head of sheep, with 445,000 sheep and 12,550 cattle being permitted (Valora, 1996). By 1909, the Supervisor had reduced the numbers of sheep to 340,000 head. At that time, sheep were grazing at a ratio of one sheep to 1.5 acres (Alexander, 1987). Another reduction was made and in 1918, 278,000 sheep were permitted on the Caribou. By 1930, use had been reduced to 219,000 sheep, and again in 1940. By the late 1940s sheep grazing had declined on National Forests by 28.5 percent, reflected by a reduction in numbers and length of season, and were using approximately 135,000-140,000 AUMs. In 1950, there were approximately 145,000 sheep permitted on the Forest. Today the Forest range program permits about 69,000 sheep grazing less than 40,000 AUMs.

According to annual grazing reports, the Caribou National Forest was permitting about 21,000 cattle in 1918. By 1930, this number dropped to about 15,000 cattle and in 1940, it was further reduced to 13,000 cattle. From 1936 through 1941, permitted cattle were at their lowest numbers on the Forest. However, cattle use (numbers of cattle multiplied by the number of months they were allowed on the Forest) peaked between 1943 and 1947 at 75,000 to 80,000 AUMs, fell off to a low in the early 1960s of about 55,000 to 60,000 AUMs. Despite this local increase in cattle, west-wide, total animal units declined on National Forests by 53.2 percent between 1918 and 1947. In 1950, permitted numbers reflect about 17,000 cattle. Today the Forest range program supports about 20,000 cattle grazing approximately 60,000 and 65,000 AUMs.

Permitted numbers of livestock, permitted animal months, actual use numbers and actual animal months have been summarized by kind of livestock, by year, starting in 1940. For sheep, the data show a long slide in permitted numbers and actual use since the first half of the twentieth century. Permitted numbers, especially in the early years, were often higher than the numbers actually authorized to graze each year, because of limited forage resources and restoration activities. Nonuse was common.

Figure 3.12 shows historical grazing use for cattle and sheep on the Forest. Data used in the figure, although collected from annual grazing reports, were reported differently through the years. The data should be viewed in a general sense with the understanding some generalizations and assumptions were made in correlating the information into common data for the graphs. For example, the Caribou National Forest boundaries have changed through the years. The Pocatello District was added to the Forest from the Cache National Forest in Utah in 1939. In 1942, the Malad District also was added to the Caribou National Forest from the Cache National Forest (Grazing Statistical Reports for 1939 and 1942). Later on, the Bear River Range was added to the Montpelier District from the Cache National Forest and the Palisades District of the Caribou (Brockman area) was transferred to the Targhee National Forest for administration. This makes actual data comparisons very difficult.

Animal unit months (AUMs) were used in Figure 3.12, because they are a better indication of the use of the land and take into consideration the amount of time livestock actually used Forest lands. An AUM is defined as "the amount of dry forage required by one animal unit for one month based on a forage allowance of twenty-six pounds per day" (Jacoby, 1974). This is not the same as an animal month, which is the amount of forage to support a specific kind and class of livestock for one month. For cattle, the data show some slight increases in

permitted numbers, but actual use (i.e. the amount of use on the Forest) has decreased over time due to reductions in the seasons of use.

Generally, actual use is less than permitted use due to annual changes in numbers to accommodate forage production differences and livestock number adjustments made for the convenience of the permittees, such as partial or complete nonuse. Overall, today fewer livestock graze the Forest over a shorter time period than historic grazing during the last hundred years.

Rangeland Vegetation Conditions

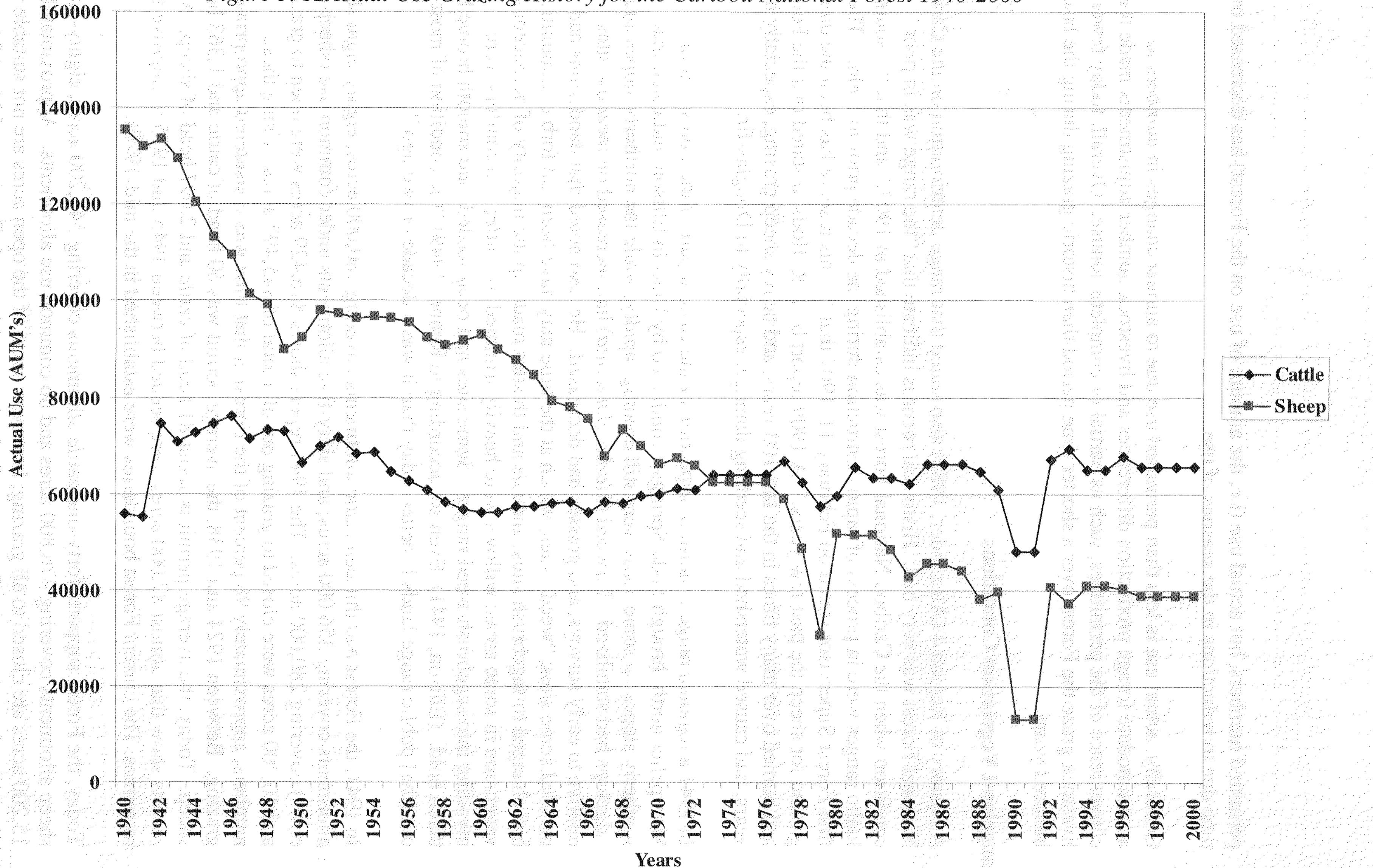
A History of Region 4 (Alexander, 1987) also stated that range deterioration on the Caribou National Forest was very bad. Historical records indicate that "the range was in poor condition when the Caribou National Forest was established in 1907," and that "...southern Idaho ranges were in process of rapid destruction during the decade prior to 1906." The very first Forest Supervisor stated on February 11, 1907 that '...this reserve has been the dumping ground for sheep the past few years." A 1909 report by E.R. Hodson stated that the Forest had burned over many times in the last 100 years, and heavy sheep grazing, especially in dry years, had caused watershed and seedling damage, especially to Douglas-fir.

In 1941 a regional range condition inspection of the eastern part of the Forest (from Montpelier north through Soda Springs), conducted by Lincoln Ellison, indicated that southerly slopes on some areas were still eroding rapidly, while the northerly slopes and ridgetops had stabilized. Tarweed (*Madia glomerata*) had increased on meadow sites relative to early surveys, and grasses had decreased. He also noted that dandelions had invaded some sites; "weed" sites, which at the time may have been tall forb communities, had changed to sagebrush sites; annuals and thistles made up the majority of herbaceous vegetation in some areas; willows were heavily trimmed by cattle; and conifers were invading into sagebrush-weed ranges. Some sites had been seeded, and smooth brome had taken hold. (Ellison, 1941) Even so, according to Renne (1949) "the condition of most of our [the] public range lands is better today than it was a decade or two ago."

In 1941, the Forest had thirteen cattle allotments covering 180,000 acres; eighty-eight sheep allotments covering 356,000 acres; and sixty-five allotments under common use (sheep and cows) covering 280,000 acres. The 1941 report shows 816,429 acres were open to grazing, and 10,700 acres were closed to grazing out of a total of 845,497 acres. Using these numbers, approximately 98 percent of the Forest at that time was considered appropriate for grazing. Between 1924 and 1938, the average permit was 60 head of cattle and 1,363 head of sheep. Today, the average permit is about 81 head of cattle and 2,097 head of sheep. Annual reports show that almost 87,000 acres were seeded between 1945 and 1975 to improve forage resources. The current Forest boundaries were established in the mid-1970s.

Today, the Forest supports forty-one cattle allotments covering 541,200 acres, eighty-one sheep allotments covering 476,800 acres and no common use allotments. Approximately 15,200 acres are closed to all grazing; however, some of the open acres are not suitable for grazing and are not used. (See Appendix B, Issue 4, Livestock Grazing and Map15.)

Figure 3. 12Actual Use Grazing History for the Caribou National Forest 1940-2000



Note: Years that show a dramatic drop reflect that information for these years was incomplete.

Current Conditions

RANGELAND CAPABILITY AND SUITABILITY

When the Forest Service was established in the western states, livestock were already using the lands heavily. Vegetation was already degraded and erosion was starting in many places (Alexander, 1987). Early agency managers worked hard at getting livestock numbers reduced, considering the challenges of doing the job with few employees and vast expanses of country that could only be accessed with a horse and packhorse. Grazing permits were based on the numbers of livestock the first ranchers grazed, and the season of use was determined by the weather. As soon as an area opened up in the spring, livestock started grazing it. With very few fences present on the landscape, livestock followed the most palatable forage wherever it occurred. Fall storms or lack of feed would drive livestock to lower elevations.

As resource science started to catch up with livestock use, a range analysis process was developed to determine range carrying capacity in an effort to base livestock permits on available resources rather than just ownership of livestock. The intent of the range analysis process was to map lands within livestock allotments that were capable (from the physical attributes) of supporting livestock grazing on a sustained basis. These lands were mapped by vegetation type, slope, access to water, soil productivity and vegetation production. An arithmetic exercise was used to add up the acres with a set amount of forage production and divide by the amount of forage allocated to each grazing animal. This process led to the establishment of set livestock permit numbers.

The season of use was determined using the average date plants were capable of sustaining use without adversely affecting carbohydrate reserves or the ability of the plants to reproduce. Livestock numbers or season of use could be adjusted to accommodate the annual variation in forage production. Before rotation systems within an allotment were considered final, allotments were monitored for three years to insure the vegetation could sustain the numbers and season of use on the permit. In some cases, monitoring either did not occur or established monitoring protocols were not followed which, in turn, led to overstocking on some permits.

Through the years, periodic livestock adjustments have been made, up and down, to better match the use with the existing resources, including other users.

Over the last ten or fifteen years, the Forest Service Intermountain Region's policy has been to graze livestock based on annual forage resources, not on a set number of livestock or

season of use. Annual monitoring is conducted on key areas[19] to determine when to move livestock between units or off the forest, instead of using a set date or number of days. Livestock permits are not adjusted on an annual basis, but if three or four years of monitoring data show consistent problems between numbers of livestock, season of use, or conflicts with other resources, then permits are adjusted on a permanent basis. Monitoring is the key to adaptive management as grazing systems, kind or class of livestock, and resource standards continue to change through time.

The 1982 planning regulations, under which this Plan is being revised (36 CFR 219.20, prior to 2001), require the mapping of capable lands for grazing, even though rangeland capability is no longer used to set livestock permit numbers. Permits have an established number and season of use that has been determined over time, and any adjustments are based on short- or long-term monitoring.

Criteria and Process for Determining Rangeland Capability

Capability is defined in the Intermountain Region Protocol 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. Capability depends on 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."*

Rangeland capability represents the biophysical determination of those areas that can sustain grazing but it is not a decision to graze livestock nor is it a capacity decision. Determining capability requires the assessment of biophysical characteristics conducive to livestock grazing. **Capable acres do not change between alternatives**.

The characteristics suggested in the Regional protocol for consideration in determining capability include:

- Areas with less than 30 percent slopes for cattle and less than 45 percent slopes for sheep
- Areas producing more than or having the potential to produce an average of 200 lbs. of forage/acre on an air-dry basis over the planning period.
- Areas with naturally resilient soils (not unstable or highly erodible soils).
- Areas where ground cover (vegetation, litter, rock is greater than 3/4 inches) is sufficient to protect soil from erosion. The minimum percentage cover will be 60

[19] **Key areas** are defined as "a relatively small portion of a pasture or management unit selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the pasture or unit as a whole" (Jacoby, 1974).

percent unless local data is available for use in setting more specific ground cover requirements.

- Areas accessible to livestock (without such factors as dense timber, rock, or other physical barriers).
- Area within one mile of water or where the ability to provide water exists.

Capability is determined using all these criteria together, but they may be modified if documented data indicates changes are warranted, or additional criteria may be developed if local conditions warrant. National Forest System lands meeting these criteria are considered capable of being grazed by domestic livestock with management.

Rangeland capability was mapped at a site-specific level by grazing allotment during range analysis in the 1960s and 1970s; however, for this forest planning effort, a GIS model was used to map capable acres using three of the criteria described above.

The model used slopes (less than 45 percent for sheep and less than 30 percent for cattle); distance from water (one mile for sheep and cattle); and the vegetative cover type. Vegetative cover was used as a proxy for forage production based on an earlier assessment documented in "A Hierarchical Stratification of Ecosystems of the Caribou National Forest" which gives a range of estimated forage production by vegetation type.

In this assessment of capability, soils were not used, because the mapping units are a mixture of various soil families, and they are not specific to a particular location on the ground. Ground cover was not used, because there is no data in GIS for mapping this criterion. Accessibility was not mapped, because it must be determined at the site-specific level. The following data sources were used in the assessment:

- Ownership of Forest Lands came from Cartographic Feature Files (CFFs)
- Slope was determined from USGS 30-meter Digital Elevation Model (DEMs)
- Vegetation came from the Vegetation Cover Types of the Caribou National Forest
- Water sources from a Forest inventory GIS layer

See Appendix B, Issue 4: Livestock Grazing for modeling assumptions and results for Livestock Capability. Model results show that about 719,000 acres on the Forest are capable of supporting sheep grazing and 469,000 acres are capable of supporting cattle grazing. More land is capable of supporting sheep, because they are smaller, lighter animals and can graze on steeper slopes without causing soil damage. These numbers are similar to the 1985 Forest Plan, which showed about 700,000 acres capable of livestock grazing.

Criteria and Process for Determining Suitability

Rangeland suitability represents the integration of capability and the appropriateness of grazing livestock on a particular area of land, considering such things as economics, social

concerns, and grazing compatibility with other land uses. It is defined in the Intermountain Region's Protocol 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."*

Suitability is assessed by alternative and determines whether livestock grazing is compatible with management direction for a management area's other uses and values. Some situations or conflicts can often be resolved through mitigation measures, such as fencing, which can make an area suitable for livestock when it would not be otherwise. Suitable and non-suitable lands may appear within a single allotment. Non-suitable lands will not be fenced to keep livestock out in most cases. **Suitable acres of livestock grazing vary by alternative.**

Suitable acres must first be capable of supporting livestock grazing and meet the capability criteria discussed above and in Appendix B – Livestock Grazing. Suitable acres can change over time or under different management options. For example, mining restoration sites would not be suitable for livestock grazing while restoration activities are underway; however, once these areas are restored to meet the rangeland capability criteria, and no social or economic values or other uses preempt grazing use, they could become suitable for livestock grazing.

Suitability was determined by alternative and is discussed by alternative in Chapter 4, Issue 4: Livestock Grazing. A full discussion of the modeling assumptions and outcomes can be found in Appendix B, Issue 4: Livestock Grazing.

POTENTIAL FORAGE OUTPUTS ON SUITABLE RANGE

From 1993-1995 Forest personnel analyzed old range site and ocular analysis forms to collect information on current vegetative types and range health conditions that were recorded during the range analysis process. Habitat type was linked to Landtype Associations mapping and was based on Rangeland Cover Types of the United States (SRM, 1994) and Forest Cover Types of the United States (SAF, 1980). Although a certain habitat type is identified, there may be other seral stages of the vegetation sequence present. The process and results are identified in "A Hierarchical Stratification of Ecosystems of the Caribou Nation Forest," 1997. Appendix A of this stratification report provides a list of all species that were recorded on the Site and Ocular analysis forms. This information provides some indication of the understory species associated with each vegetation cover type.

In the *Initial Analysis of the Management Situation* (AMS) report (1999) six different rangeland cover types were identified on the Forest and are discussed below. Two forested cover types are grazed and provide a significant amount of forage in open stands so these were added to this discussion. These eight vegetation cover types were used in the suitability analysis for livestock grazing. Each cover type description includes overstory, understory,

structure, annual production, soils, influences, water availability, elevation, palatability, disturbances, rehabilitation opportunities and climate information. More information on vegetation composition, structure and ecology is found in the Ecosystem Management section under Forested Vegetation and Non-Forested Vegetation; in Appendix B—Livestock Grazing and in the Project File.

SAGEBRUSH

The grass/sagebrush community is the largest range type in extent on the Forest. More than eleven sagebrush taxa are represented on the Forest but the cover type is characterized by a species of sagebrush (*Artemisia,* spp.). The understory composition is strongly influenced by physical and chemical soil characteristics and by disturbances. The sagebrush communities consist of varying amounts of grass and forbs (broad-leaved herbaceous plants). Both grazing intensity and kind of grazing animal have effects on the composition of the understory.

The sagebrush cover type is described in SRM Cover Types 401, 402, 403, 404, 405, 406, and 408. Some of the sagebrush taxa present on the Caribou National Forest are not included in the SRM publication.

In this cover type, other shrub species may be present in small amounts. The understory composition varies depending on the specific community, the amount of disturbance, and subsequent recovery (i.e., succession). The big sagebrush communities are quite productive and yield between 700 to 1,200 pounds of air-dry forage per acre. Sagebrush communities have undergone the majority of revegetation efforts to reduce dense overstories and improve forage resources. The fire return interval in this type ranges from twenty to sixty years, depending on the sagebrush subspecies. Generally, they do not resprout after fire. Sagebrush communities provide the largest amount of available forage for livestock and wildlife.

MOUNTAIN BRUSH

SRM Cover Type 421 provides a fairly accurate description of this vegetation. It consists of sagebrush and chokecherry, serviceberry, current, elderberry, rose, and snowberry in varying combinations. One or more of these species may dominate the site. Generally, these species resprout after fire. A twenty- to forty-year fire return interval is typical in this cover type. Mountain brush sites produce high forage, yielding about 800 to 1,300 pounds per acre of air dry forage. The understory is very diverse on most sites. Mountain brush sites are highly valued for wildlife habitat, livestock grazing, and watershed protection.

MOUNTAIN MAHOGANY

The mountain mahogany community is described by SRM type 415. The type is dominated by curlleaf mountain mahogany, and generally, has a very sparse understory of a few forbs and grasses. Mountain mahogany sites produce low forage, yielding about 650 to 750 pounds per acre of air dry forage. Other shrub species may also be present. Mountain mahogany is often tree-like in appearance, growing upwards to 25 or 30 feet high. This

cover type is typically found in pure stands on rocky, infertile soils. Mountain mahogany is highly desired as winter feed for big game.

Maple

This type is commonly multi-stemmed or single stemmed big-toothed maple (*Acer grandidentatum*). It can occur in riparian areas and be a co-dominant with box elder (*Acer negundo*). The understory is comprised of a variety of shrubs, forbs, and grasses. Maple sites produce moderate forage, yielding about 800 to 1,000 pounds per acre of air dry forage. In a pure stand with a closed canopy, understory species may be completely absent under the canopy. Big-toothed maple may have a slight allelopathic[20] influence and typically develops on deep soils. Grazing is often limited by the scarce amount of understory species. It is known to resprout after fire disturbance, but the lack of fire disturbance over time has caused maple to extend its range into sagebrush and mountain brush types. (See SRM cover type 418 for a more thorough description.)

Juniper

This rangeland type is dominated by either Rocky Mountain (*Juniperus scopulorum*) or Utah (*Juniperus osteosperma*) juniper. Rocky Mountain juniper may be a separate type, but Utah juniper often intermingles with shrub and woodland cover types. Utah juniper grows on relatively dry sites that receive ten to fifteen inches of annual precipitation. It does not sprout after fire. Rocky Mountain juniper is found on mostly calcareous[21] and alkaline[22] soils on sites receiving eighteen to twenty inches of annual precipitation. The understory in this type depends on the canopy cover and annual precipitation effectiveness. Juniper sites produce very low forage, yielding about 400 to 500 pounds per acre of air dry forage. Livestock grazing and fire suppression has allowed this type to expand into the sagebrush cover types. The overstory becomes denser, crowding out understory species of shrubs, grasses and forbs. (See SRM type 412.)

Tall Forbs

Although this range cover type is of relatively small extent on the Forest, it is very important and therefore is included here. SRM cover type 409 describes it as an array of luxuriant, tall, mesic forbs. Generally, it has inconspicuous grasses and sedges, and shrubs are mostly absent. The forbs are tall, ranging from sixteen to forty-eight inches, and very diverse in composition. They grow in areas of deep soil on high elevation sites with late summer precipitation. These sites were used heavily early in the twentieth century and have now been invaded, in some cases, by a monoculture of tarweed (*Madia glomerata*). Tall forb sites were prime candidates for restoration. Several sites have been plowed and seeded numerous times to introduced grass species. Microsite features within any one location will allow certain species to become dominant. A species list can be found in the AMS.

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[20] **Allelopathy** refers to the production and emittance of organic compounds by an organism that causes detrimental consequences for its neighbors (National Research Council, 2002).

[21] **Calcerous** means resembling calcite or calcium carbonate especially in hardness; consisting of or containing calcium carbonate; growing on limestone or in soil impregnated with lime (Webster, 1976).

[22] **Alkaline** means having a pH of more than 7.

These types are small and dispersed across the Forest and were not used in forage output computations.

SEEDINGS

Seedings are not considered a separate range type. Rangeland treatments by land managers have been occurring on the Forest since the mid 1940s. Early treatments were used to increase forage production for permitted livestock and to repair overuse problems by restoring ground cover. Until the 1960s, when airplanes and helicopters became the preferred method of spraying for brush, most brush control employed the use of chains, plowing, or other methods of ripping the brush off the land. Prescribed fire was used occasionally.

After the 1960s, spraying with the herbicide 2,4-D became the preferred way to control sagebrush and other undesirable plants. Most commonly, the brush was treated and the native understory was allowed to re-establish without competition from the brush. Sometimes, sites were so degraded that they were treated to remove the brush and then seeded to a variety of introduced species. On rare occasions, sites were simply seeded with no previous treatments by broadcasting the seed across the area. More recently, burning has become a preferred brush treatment method, and is expected to increase, due to its relatively low cost and the concerns over chemicals in the environment. A few native grasses have been seeded on sites, but non-natives, such as crested wheatgrass, smooth brome, timothy, and bulbous bluegrass were more often available and seeded on these sites. Relatively few native broad-leafed plants have been available, but yellow sweet clover, sainfoin, and alfalfa are three that have been seeded.

A review of records for seeding acreages and treatments on the Forest indicates approximately 63,000 acres (25,515 ha) of rangelands have been treated. It should be noted that some records were missing. Table 3.34 shows the acres and treatments for which records exist. However, annual grazing statistical reports show that between 1945 and 1975 almost 87,000 acres were seeded.

Table 3. 34 Seeding Treatment and Acres Treated

Seeding Treatment Description	Acres Treated	(Hectares)
Acres seeded (with no prior treatments)	1,514	(613 ha)
Acres treated (sprayed, burned, chained)	38,524	(15,602 ha)
Acres treated and seeded (not counting reseedings)	23,400	(9,477 ha)
TOTAL	**63,438**	**(25,692 ha)**

In addition to the range types described above, several forested types have also undergone extensive grazing.

ASPEN

Aspen has the greatest extent of any single cover type forest-wide. It covers more than 294,000 acres and has been heavily used by all kinds of grazing animals. It can occur as isolated, scattered clumps or as broad expanse of forest. Aspen understories are varied, due to the elevational and ecological amplitude of aspen, and consist of perennial grasses and forbs with shrubs, such as willows, rose, snowberry, chokecherry and serviceberry. Aspen occurs on sites that receive a minimum of sixteen to twenty inches of annual rainfall. Aspen is one of the most productive types on the Forest, yielding between 900 to 1,300 pounds air-dry forage per acre. The aspen cover type reproduces vigorously by suckering after fire or other disturbances. SRM cover type 411 and SAF 217 describe aspen types.

Aspen and mixed aspen types are often seral to timber types. As aspen trees age and succession continues, conifers, usually Douglas-fir or subalpine fir, overtake them. As a result, a reduction occurs in the understory as conifers shade and compete for moisture. In the rangeland capability analysis aspen/conifer and the aspen/maple cover types were included in grazed lands. Succession and lack of fire disturbance in the aspen types allow Douglas-fir, subalpine fir and maple to crowd out aspen.

DOUGLAS-FIR

SAF Cover Type 210 describes this cover type. Douglas-fir communities are widely distributed on the Forest, and in many areas, it is encroaching on aspen, mountain brush and sagebrush types through succession and the lack of fire disturbance. In open stands of low densities, bunchgrasses are most common with some broad-leaved forbs and shrubs. Forage production on these types ranges from about 500 to 900 pounds air-dry forage per acre.

RIPARIAN

This cover type is described by SRM type 421. Riparian areas support a variety of moisture-loving plants, particularly where water tables remain high for the majority of the year. Riparian sites are very productive in terms of diversity and biomass per unit. Gradient determines whether herbaceous plants or willows are prominent. Gradients of less than .5 percent primarily support grass-like and herbaceous species (Winward, pers. comm. 1997). Riparian areas that have a majority of deep-rooted species present are the key to buffering these areas from the effects of high water. Riparian areas are easily lost from down-cutting and lowering of water tables if protective streambank plants are lost.

Riparian areas provide a wide array of habitats. Riparian communities vary widely depending on their elevation and available moisture. Because of the availability of open water, they are highly desirable for feeding animals, both domestic and wildlife. Vegetation production is high, ranging from about 1,500 to 2,000 pounds per acre on the most productive sites.

Table 3. 35 Potential Production by Community Type.

Community Type	Production Potential
	(Pounds/Acre) per Year
Aspen	1,041 lbs.
Aspen/Conifer	805 lbs.
Aspen/Maple	1,016 lbs.
Douglas-fir	655 lbs.
Grass/Shrub (Sagebrush)	937 lbs.
Juniper	440 lbs.
Mahogany	710 lbs.
Maple	990 lbs.
Mountain Brush	1,052 lbs.
Riparian	1,750 lbs.

Table 3. 36 Potential AUMs Based on Potential Forage Production on Suitable Acres and current utilization rates.

Suitable Acres		Estimated Forage Production in Pounds		Herbage Use Rate	Potential Capacity (based on uniform use)**	
Cattle	**Sheep**	**Cattle**	**Sheep**		**Cattle**	**Sheep**
460,303	701,942	419,495,065	626,425,756	55%	213,632	1,640,639

** Potential Capacity measured as Cow/Calf Month (1,080 lbs/mo) or as Ewe/Lamb Month (210 lbs/mo)

CHANGE IN ACTUAL USE BASED ON CURRENT MANAGEMENT

As discussed in the "History" section, the Forest currently supports forty-one cattle allotments covering 541,200 acres, eighty-one sheep allotments covering 476,800 acres and no common use allotments (See Tables 3.37 and 3.38 below). Approximately 15,200 acres are closed to all grazing; however, some of the open acres are not suitable for grazing and are not used. (See Appendix B for the analysis process for Suitability and the Livestock Allotment Map 15.)

As discussed previously, generally, actual use is less than permitted use due to annual changes in numbers to accommodate forage production differences and livestock number adjustments made for the convenience of the permittees, such as partial or complete nonuse. Actual use may change by alternative since they have different allowable use standards, varying levels of potential treatments, and differences in acres of suitable range. With current allotment and livestock management, the Forest permits about 70,000 AUMs of sheep and 65,000 AUMs of cattle. These are the permitted numbers; actual use of sheep on the Forest is about 35,000 AUMs only.

Table 3. 37 Currently permitted cattle AUMs in Alternative 1.

Ranger District	Permitted Number	Number of Allotments	AUMs Permitted	Percent of Total AUMs
Westside	7,495	10	29,133	40%
Soda Springs	4,699	10	17,675	25%
Montpelier	8,110	21	24,899	35%
TOTAL	**20,304**	**41**	**71,707**	**100%**

Table 3. 38 Currently permitted sheep AUMs in Alternative 1.

Ranger District	Permitted Number	Number of Allotments	AUMs Permitted	Percent of Total AUMs
Westside	8,772	9	16,851	9%
Soda Springs	46,095	49	108,746	58%
Montpelier	24,368	23	61,609	33%
TOTAL	**79,235**	**81**	**187,206**	**100%**

As described in the "Permit Administration" section, livestock are moved when allowable use standards are met, regardless of the permitted numbers. For this analysis, we have estimated the change in actual use based on the features of each alternative. That is, with current livestock management (by the permittee), how would actual use change in response to each alternative. Lower utilization levels for big game winter range, deferment of grazing due to vegetation treatments, and riparian use levels are some of the alternative features that would affect actual use. This estimation is based on current management by the Forest Service and permittees. If more effort is put into better management such as daily herding, strategic salting, or fencing out riparian areas, these reductions in actual use may not be realized. This will be further explained in Chapter 4: Livestock Grazing: LG3.

LG4: UPLAND VEGETATION RESPONSE TO GRAZING

RANGELAND CONDITION

The term "range condition" is difficult to define, because it has had different meanings over time and was applied in different ways by land management agencies. Several approaches by land management agencies have been used to evaluate the past and present condition of rangelands. These evaluations generally are complex technical concepts that rely on professional judgment and the ability to recognize indicators and their significance (SRM, 1989).

Much of the controversy surrounding the status of range conditions today stems from the use of different and sometimes subjective assessment terminology, such as "good," "fair," or "poor," to describe rangeland conditions. One side may argue that the loss of soil and native grasses has had disastrous effects and is threatening the ecological functions of rangelands. Others argue that rangelands are in the best condition in a century. Both views are technically correct. Disagreements over range policy become one of values - the value

society puts on rangelands and society's expectations of the benefits that rangelands should provide (Congressional Research Service, 1997) or on differences of opinion over visions of the land (Spaeth, 1996).

Generally, the term "range condition" is used to describe the status of lands in relation to something (vegetation succession, watershed conditions, livestock grazing, wildlife habitat), and generally, it refers to "the state of range health" (USDA-FS, 1951; SRM, 1989). In 1989 the Society of Range Management (SRM) defined range condition as "the present status of a unit of range relative to specific values or potentials. Inherent in this concept is that range condition must be interpreted in terms of potential of the site."

Early evaluations of range condition were based on the concepts of succession developed by Clements in the early part of the twentieth century. Clements' concepts were further refined into operational procedures by Dyksterhuis (1949) and Parker (1954). Over time, land management agencies developed their own procedures. Generally, the method involved comparing the existing vegetation species composition to the expected "climax" or "potential vegetation" for a particular site. The site was then rated as excellent, good, fair, or poor, depending on its similarity to the climax. This whole approach was based on the assumption that "climax" vegetation is the **best** in terms of stability, diversity, and productivity, and that succession is a linear process that is predictable and reverts the site to the original vegetation type (Willoughby and Alexander, 2000; Joyce 1993; Walker, 1993).

Several researchers recognized problems with this traditional approach when sites did not recover following disturbances other than grazing, or when removal of livestock did not produce the expected vegetation changes. Others recognized the lack of a relationship between soil protection, wildlife habitat, and productivity with the "climax" vegetation (Task Group on Unity in Concepts and Terminology, 1995; Laycock, 1991; Walker, 1993).

Shrub communities typically evolved with some level of grazing. Over time, it is believed that a balance was achieved between the overstory shrub layer and the understory herbaceous layer. This balance was disrupted by the arrival of large herds of livestock trailing through with the emigrants. Later, large wintering herds of cattle and summering tramp bands of sheep overused the rangelands, which led to a depleted understory, created bare soil in some areas, and allowed the deep-rooted overstory to become denser, as competition from the understory was reduced. The cycle of naturally occurring wildfire, which also helped to keep the overstory in balance, was reduced as fine fuels were grazed away, litter was reduced, and herders and homesteaders suppressed fires.

Ellison observed that lessening the intensity of grazing was sometimes "conspicuously ineffective" in improving poor condition rangelands. He observed a watershed that continued to erode excessively even after 25 years of no grazing. He went on to speculate that soil quality often lags behind vegetation improvement and certain processes may be put into motion through grazing but continue independently until they have run their course (Ellison, 1941). His observations included comments that "we may start a process which we cannot stop. So far as management is concerned, we are helpless and cannot hope to see an end of the depletion until it has run its course." This is the same concept being discussed and

expanded today in that there may be more than one threshold of stabilization, and once degraded, the original state may not be obtainable again.

In the 1980s range condition scores did not provide land managers with information they needed about diversity, erosion potential, nutrient cycling, value for wildlife, or productivity. In 1989, a task group was formed to bring agencies together to develop a common methodology and terminology. As a method to measure vegetation conditions, the Forest Service adopted the concept of "Ecological Condition." Ecological Condition is defined as "the relative capacity of a system to: 1) perform selected functions, and 2) to maintain these functions following disturbance through processes of resistance and recovery" (Herrick, *et al*, 1996). This definition emphasizes **selected** functions. Since ecosystems perform many functions, optimizing one function may reduce another function for a certain period of time. For example, restoration of mining sites with non-native grasses may optimize soil recovery, but the use of non-native grasses slows the reestablishment of the diverse native vegetation.

During the 1990s new models were developed for range condition and trend assessments. Land managers and researchers slowly came to realize that multiple steady states for vegetation types could occur (Laycock, 1991). They suggested that drastic changes to a site could cause a "threshold" to be crossed that would prevent the site from following the linear succession familiar to, or assumed, by most people. The former state would not be attainable without significant management actions (Friedel, 1991; Tausch, *et al*, 1993). The state and threshold model implies that some vegetation types can be stabilized by invading plants and DO NOT succeed to the original vegetation (Willoughby, 2000).

Recognizing that rangeland vegetation is determined primarily by climate and soil, and that one site may support several different plant community types at different locations or times, the Task Group on Unity in Concepts and Terms (1995) recommended that any vegetation type that protected the site from accelerated erosion could be selected and managed on the site, based solely on management objectives. They suggest that communities capable of occurring on the site and protecting it from crossing a threshold are acceptable management goals, because these communities provide sufficient site protection to maintain future management options. The choice of the community type on a particular site is the "desired future condition," and it is identified through a management plan to best meet the plan's objectives for the site. The desired plant community should meet two basic objectives:

- "To conserve to the extent practicable, the long-term potential of the site to produce vegetation;"
- "To produce in the shorter term those combinations of goods and services desired from the land" (Task Group, 1995).

In summary, "rangeland condition" is a rating of the existing vegetation on a site against the desired vegetation conditions. "Condition" is rated as satisfactory or unsatisfactory, depending on whether the site being rated is meeting current management objectives. Desired vegetation conditions are achieved over time by implementing management objectives to protect and sustain site capabilities and to produce desired goods and services.

Trend is defined as "the direction of change in ecological status." "Ecological Status" is defined as the degree of similarity between the present community and the potential natural community of a site. It considers only secondary succession. Four categories are considered: the potential natural community or PNC, late seral, mid seral and early seral. Trend is characterized as "toward potential," "away from potential," or "static" (SRM, 1989) or "direction of change over time" (FSH 2209.21). Trend monitoring verifies if management actions are achieving desired conditions over time. The appraisal of trend is simply the recognition of the nature, rapidity, and direction of ecological change (USDA-FS, 1951).

Long-term trend is the direction of change in range condition. Evaluations of long-term trend are used to monitor the effects of management decisions toward a desired condition. Detection of trends and recognition of particular changes in vegetation states require continuous rangeland monitoring over many years (Walker, 1993). **Long-term** measured trend is determined over many years and reflects changes between condition classes or the decline or improvement in plant communities compared to the potential or desired conditions for a particular site. **Long-term** trend is determined through permanent transects or quantitative studies on-the-ground in representative plant communities. In some cases, only long-term photographs are recorded (qualitative).

Apparent trend is an evaluation of a single observation at one point in time. **Apparent** trend is an on-the-ground evaluation of what appears to be happening under current management. It is useful for gauging needed changes in management (SRM, 1989). **Apparent** trend is an interpretation of the direction of change, based on the evidence obtained by an experienced observer at a single observation (FSH 2209.21).

To understand trend it is useful to understand the difference between "succession" and "destructive change." Destructive change occurs when vegetation is lost completely, and disturbance allows erosion to occur at an accelerated rate. This process of destructive change alters the site's potential, and the site must then be re-evaluated in relationship to its new capabilities or potential. As a result, these sites should be considered "new" sites with a "new" potential and NOT compared to surrounding sites that may retain the old potential for a particular community or a higher production capability. As a result, recognizing the balance between ecosystem components and a normal rate of succession is important to judging condition and trend (W.K. Lauenroth and W. A. Laycock, 1989). Just as important, but more difficult to ascertain, is determining when destructive change has caused the crossing of a critical threshold which makes it impossible to achieve the previous condition even after many years of no disturbance. It may take human interference or another catastrophic event to stimulate the system or cause changes that would lead to a more desirable direction (Friedel, 1991; Laycock, 1991; UCRB-DEIS, Appendix F, 1997; Tausch, *et al*, 1993).

"Indicators are elements of an ecosystem used to assess attributes that are too difficult or expensive to measure" (Pellant, 1995). Historical range condition and trend indicators were focused on vegetation and soil stability indicators (USDA-FS, 1951). Some of the main indicators of trend are plant composition changes, plant age distribution, litter, and soil

surface conditions (Polk, 1992). With the evolution of the concept of rangeland health, soil and ecological processes need to be considered, also. With complex ecosystems, no one indicator monitors ecosystem health. Combinations of physical and biotic indicators have been suggested for trend determinations (Pellant, 1995).

Indicators are one tool that can provide early warning signs of resource problems that could then trigger changes in management actions before degradation reaches a nonfunctioning or unhealthy situation. Currently, interpretation of condition and trend is more of an "art" than a "science" (Pellant, 1995).

Many indicators of condition and trend should be interpreted together, not individually. Arid and desert lands, subject to variable rainfall, produce vegetation that is dynamic and often reacts to factors other than disturbances, such as annual or seasonal precipitation patterns, especially moisture patterns, because once the occasion passes it is difficult to reconstruct past events. This is a characteristic problem in evaluating long-term data sets (Clary and Holmgren, 1985). Clary and Holmgren suggest that some of the major factors to consider when relating vegetation reactions to grazing include: grazing treatment – duration of years as well as season and intensity; grazing species – diet considerations and behavior across the land; botanical composition – interspecies competitiveness; soil and site factors; weather and climate cycles; insects and disease. The Intermountain Region uses Form R4-2200-25 (1/93) to record apparent trend ratings in the field.

UNCERTAINTIES AND PROBLEMS WITH CONDITION AND TREND INFORMATION

Historical documents indicate that southeastern Idaho, and specifically the Caribou National Forest, was extremely degraded by livestock overuse at the beginning of the twentieth century. Livestock numbers and seasons of use, as well as kind (cattle or sheep) and class (yearlings, mothers with young) of livestock, were adjusted constantly through the century and continue to be adjusted as resource conflicts occur. Early condition ratings were replaced by ecologically based classifications. No crosswalks were completed between the two systems. Early long-term trend studies also have been replaced with newer more statistically sound methods to determine long-term ecological trends. Until multiple readings have occurred, it will be difficult to draw any conclusions. However, some indicators show that range health seems to be improving.

New concepts suggesting stable states and resource thresholds have been adopted along with Clementsian theories on succession and climax vegetation. The scientific community has accepted the idea that simply removing livestock does not necessarily allow vegetation or other resources to revert to the condition that was present prior to livestock grazing.

Nationally, different land management agencies use different protocols, and therefore, interpretations and comparisons need to be done very carefully (Laycock, 1991). A site may be managed for a seral stage less than the Potential Natural Community (PNC), and management objectives need to be established for the site for achieving the desired conditions (Herrick, 1996).

Interpretation of range condition data is incomplete without trend information that should reflect the specific management objectives for a site. Management objectives can often be met in more than one ecological stage. Range condition and trend evaluation and reporting continue to evolve on a national scale (Busby and Cox, 1994; O'Brien *et al*, in Press; Pellant, 1995; Hardy, 2002).

Regional Summaries of Rangeland Condition and Trend

In 1989, a National Summary of Range Condition was documented by the Society for Range Management. The summary showed that those rangelands managed by the U.S. Forest Service in Idaho and the Great Basin were in the following condition. Trend for the Intermountain Region shows 30 percent of the lands in an upward trend, a static trend on 60 percent, and a downward trend on 10 percent (SRM, 1989).

Table 3. 39 Summary of Range Conditions in Idaho and the Great Basin, 1989.

Vegetation Status	Idaho		Great Basin (Average)[1]	
	Satisfactory[2]	Unsatisfactory	Satisfactory	Unsatisfactory
Potential Natural Community (PNC)	15.0%	<1.0%	11.0%	<1.0%
Late-Seral	39.0%	<1.0%	32.5%	<1.0%
Mid-Seral	22.0%	13.0%	27.0%	12.5%
Early-Seral	5.0%	6.0%	2.5%	14.0%

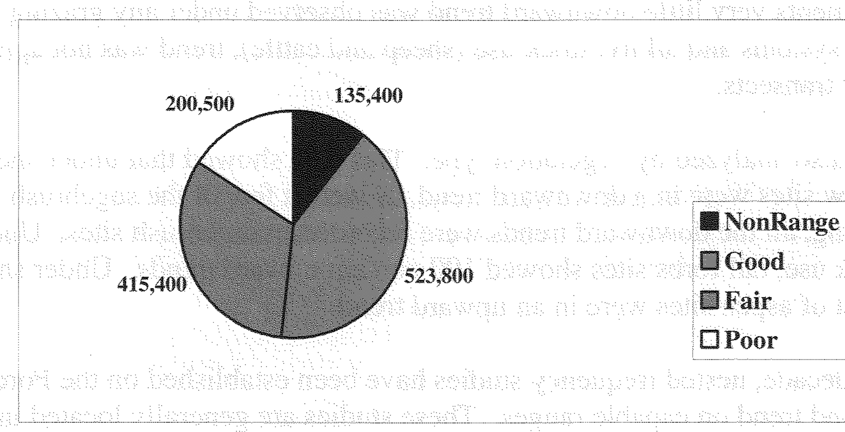
1 The Great Basin includes the Forest Service portions of Idaho, Nevada, Utah, and Wyoming managed by the Intermountain Region.

2 A satisfactory rating is defined as: The soil is adequately protected and the forage species composition and production is acceptable.

Caribou National Forest Rangeland Condition

In 1975, an Intermountain Region summary reported rangeland vegetative condition by Forest. For the Caribou National Forest, the following ratings were determined for grazed ranges for cattle and sheep (See Figure 3.13). Measurements are in acres for the entire Forest, including rangelands, and do not match the current Forest acres, because of administrative adjustments to the lands administered by the Caribou National Forest.

Figure 3. 13 Acres in Range Condition Classes, Caribou National Forest, 1975.



In the mid 1980s the Forest Service switched to an ecosystem based method of monitoring and began measuring vegetation in relationship to range ecological health and seral stages. Table 3.40 shows information for the capable rangelands on the Forest using this method of assessment. These acres were determined by a completely different methodology than the 1975 figures shown above and cannot be compared.

Table 3. 40 Capable Rangeland Acres Using Ecological Health and Seral Stage Assessment Method.

Condition	PNC (Acres)	Late-Seral (Acres)	Mid-Seral (Acres)	Early-Seral (Acres)	Total (Acres)
Satisfactory	94,924	271,127	182,793	1,448	550,312
Unsatisfactory			121,863	27,517	149,380
TOTAL Capable Rangelands					669,672

CARIBOU NATIONAL FOREST RANGELAND TRENDS

In 1980, the Intermountain Region dropped Parker 3-Steps as a method of measuring long-term condition and trend. At that time, it was replaced by Nested Frequency studies that were more accurate in measuring long-term vegetation changes for ecosystem management. An analysis of many of the 3-Step studies that were recorded on the Caribou NF is summarized in the following table by grazing system. Of all the lands under each grazing system, the percentages represent the proportion in each trend category.

Table 3. 41 1980 Summary of 3-Step Studies on the Caribou National Forest.

Grazing System	Upward Trend	No Apparent Trend	Downward Trend
Season-long Grazing	21%	42%	37%
Deferred Rotation	23%	75%	2%
Rest Rotation	39%	56%	5%
Total All Systems	28%	58%	14%

All the downward trends under season-long grazing were attributed to sheep grazing; on cattle allotments very little downward trend was observed under any grazing system. Under all grazing systems and all livestock use (sheep and cattle), trend was not apparent on the majority of transects.

Data were also analyzed by vegetation type. This data showed that under sheep grazing, all wet meadow sites were in a downward trend, as were a few of the sagebrush sites. Under cattle grazing, all the downward trends were recorded in sagebrush sites. Under both kinds of livestock use, tall forbs sites showed 100 percent upward trends. Under sheep grazing, 100 percent of aspen sites were in an upward trend.

In the last decade, nested frequency studies have been established on the Forest to monitor condition and trend on capable ranges. These studies are generally located in representative

plant communities that reflect management objectives and are on suitable range within allotments. These long-term quantitative studies are re-read at ten year intervals. None have been re-read to date.

Conclusions were drawn from the initial establishment data shown on Table 3.___ (Nested Frequencies). Only six of the twenty-four nested frequency sites did not have Kentucky bluegrass (*Poa pratensis*) present on the transects. Kentucky bluegrass is generally considered an introduced species, although Sampson (1924) suggests it closely resembles Canada bluegrass (*Poa compressa*), which may have originated in the far North. Once established, it is very difficult to replace with more desirable species, because it spreads through tillering, a form of rhizome. Smooth brome (*Bromus inermis*), an introduced species that is often seeded, was found on three of the plots. Other introduced species including timothy (*Phleum pratense*), orchardgrass (*Dactylis glomerata*), and bulbous bluegrass (*Poa bulbosa*) were found on some plots. Oral comments indicate that herders were often given bags of seed to spread on degraded rangelands, which could explain the wide distribution of some of these introduced species.

Upon examination of the list of species within these transects, many of the sites appear to be in an early seral state. This cannot be verified until a late seral site is found so a comparison can be made to each transect site. Most transects also appear to be in an upward or stable apparent trend; thirteen sites were ranked as upward or stable; two were ranked as downward; and the other sites were not ranked. Tarweed (*Madia glomerata)* was located on seven transects. This plant may be a native species, but in some situations it will completely take over a site. It is known to produce an allelopathic response in the soil that keeps seeds of other species from germinating (Hull and Cox, 1968; Carnahan and Hull, 1962).

Eighteen "greenline" studies designed to measure condition and trend of riparian areas have been evaluated. Most of these sites rated "high" or better in bank stability: six sites rated "high;" five sites rated "moderate;" and the remaining sites were not rated. Three of the sites were determined to be at potential, three were in late seral status, three were in mid seral status, seven were in early seral status and two were unranked. Trend was considered upward on three sites, and on the others, it was not indicated. Kentucky bluegrass was present on twelve of the greenlines. Protocols for these studies are found in the Intermountain Region Integrated Riparian Evaluation Guide (IREG).

Table 3. 42 Summaries of Nested Frequency Studies on the Caribou National Forest.

District	Allotment	Name	Date Installed	Vegetation Type	Percent Ground Cover	Percent Canopy Cover of Sagebrush	Apparent Trend
Westside	Portneuf C&H	Wood Road	7/16/96	Mtn Big Sagebrush/ Idaho Fescue	86%	10%	⇑ ⇒
Westside	Mink Creek	Mink Creek	7/17/96	Mtn Big Sagebrush/ Idaho Fescue	94%	22%	⇑ ⇒
Westside	Midnight	Midnight	7/18/96	Forb	82%		⇑ ⇒
Westside	Wrights Creek	Wrights Cr.	8/20/96	Willow/Sedge Riparian	99%		⇑ ⇒
Westside	Old Canyon	Old Canyon	8/19/96	Dry Meadow	100%		⇑ ⇒
Westside	Clifton Basin	Clifton Basin	8/21/96	Mtn Big Sagebrush/Snowberry/ Idaho Fescue	78%	16%	⇓
Soda Springs	Bridge Creek	Tincup Cr. Ed Canyon	8/13/96	Mtn. Brush (Forb)	87%		⇑ ⇒
Soda Springs	Bridge Creek	Unit 5	7/5/95	Mtn Big Sagebrush/ Idaho Fescue	82%	14%	⇑ ⇒
Soda Springs	Bridge Creek	East Basin	7/10/96	Forb	71%		⇑
Soda Springs	Diamond Creek	Bear Canyon	7/5/94	Mtn Big Sagebrush/ Idaho Fescue	67%		
Soda Springs	Caribou Mountain	Jacknife Basin	8/6/96	Forb	67%		⇑
Soda Springs	Dry Valley	Mud Springs	6/6/94	Mtn Big Sagebrush/ Idaho Fescue	73%		
Soda Springs	Dry Valley	Wilde Canyon	6/28/94	Mtn Big Sagebrush/ Idaho Fescue	66%		⇒
Soda Springs	Caribou Mtn S&G	281,282,283	8/6/96	Mtn Big Sagebrush/Snowberry/ Idaho Fescue	78%		
Soda Springs	Caribou Mtn S&G	Morgan Meadow	7/12/96	Dry Meadow	68%		⇓ ⇒

Table 3. 43 Summary of Greenline Studies on the Caribou National Forest.

District	Allotment	Name	Date Installed	Vegetation Type	Stability Index	Percent Early Seral Species	Percent Late Seral Species	Ecological Status
Westside	So. Fork Toponce	Toponce	8/27/96	Geyer's willow/ Beaked sedge	8.5 Very High	5%	95%	PNC
Soda Springs	Bridge Creek C&H	Bridge Creek	6/25/95	Booth willow/ Beaked sedge	7.9 High	22%	77%	Late
Soda Springs	Bridge Creek C&H	East Basin	8/5/96	Geyer's willow/ Beaked sedge	5.5 Mod.	62%	37%	Early
Soda Springs	Caribou Basin C&H	Unit 2 Camp Creek	8/7/91	Booth willow/ Beaked sedge	7.5 High	11%	89%	PNC
Soda Springs	Caribou Basin C&H	Unit 3 Camp Creek	7/29/92	Geyer's willow/ Beaked sedge	7.0 High	43%	55%	Mid
Soda Springs	Caribou Basin C&H	Unit 1 Miners Delight	7/22/92	Geyer's willow/ Beaked sedge	7.0 High	51%	49%	Mid
Soda Springs	Caribou Basin C&H	Unit 4- Miner's Delight	7/22/92	Booth willow/ Nebraska sedge	7.0 High	48%	52%	Mid
Soda Springs	Diamond Creek C&H	Bear Creek	8/16/95	Shrubby cinquefoil/ Kentucky bluegrass	4.0 Poor	90%	7%	Very early
Soda Springs	Diamond Creek C&H	Stewart Creek	8/28/95	Spruce/ horsetail	3.0 Poor	89%	5%	Very early
Soda Springs	Diamond Creek C&H	Unit 3	7/27/92	Geyer's willow Beaked sedge	-	-	-	Mid
Soda Springs	Dry Valley	Good Heart	5/11/94	Geyer's willow/ Kentucky bluegrass	5.5 Mod	59%	40%	Early-mid
Soda Springs	Dry Valley	Lonetree	6/21/95	Beaked Sedge	5.5 Mod	65%	30%	Early
Soda Springs	Dry Valley	Slug Creek	6/20/94	Geyer's willow/ Kentucky bluegrass	9.5 Exc	2%	96%	PNC
Soda Springs	State Section	Blackfoot	8/28/95	Geyer's willow/ Beaked sedge	7.0 High	26%	69%	Late
Soda Springs	State Section	Johnson Creek	6/13/95	Willow/Beaked sedge	5.5 Mod	74%	26%	Early
Montpelier	Montpelier-Elk Valley	Rock Creek	8/23/96	Geyer's willow/ Beaked sedge	6.0 Mod/High	71%	29%	Early - Upward trend

Issue 5

Minerals Operation, Reclamation and Associated Hazardous Substances Management

Analysis Scale:

Southeast

Issue Statement:

Reclamation practices for mined lands on the Forest are currently in place and being implemented. Some people feel current reclamation standards are adequate; others advocate development of additional standards that minimize or eliminate the potential release of selenium and/or other hazardous substances and require topsoil management, use of native plant species, and more natural-appearing landscapes in mining reclamation activities.

Issue Indicators:

No comprehensive issue indicators exist for this issue; however, different management direction approaches (prescriptive or adaptive) have been developed which show some differences between Alternatives. These approaches are explained in Chapter 4 under the Minerals section. Another somewhat useful indicator is the potential for limited future road construction/reconstruction and access associated with adoption of the National Roadless Initiative direction in some of the Alternatives.

BACKGROUND TO ISSUE

Regulations and Forest Service policies concerning the leasing of National Forest System lands for oil and gas development have changed since the Forest Plan was completed in 1985. The Plan needs to address these changes.

The discovery that selenium (Se), and possibly other hazardous substances, was leaching from phosphate mine sites in southeast Idaho has become a major issue since the existing Forest Plan was written. The current Plan does not address this concern nor provide specific direction for hazardous substance management. This issue needs to be addressed in the Forest Plan revision.

Although current mining and reclamation practices associated with phosphate mining on the Forest require suitable topsoil salvage, backfilling of pits, creating more natural appearing reclaimed landscapes, and the greater use of native plant species in reclamation, these things are not required in the existing Forest Plan. To help ensure these practices continue and that Best Management Practices for reclamation are used in mining operations, many felt direction in the Forest Plan revision was necessary.

Current Conditions

Geology and mineral resources are best described in a somewhat regional setting. Accordingly, the following description and discussion of the existing environment as it relates to mineral and geology resources will generally use southeast Idaho as the reference section, unless otherwise indicated.

The geology of the Forest is diverse and complex. The eastern part of the Forest lies within the western edge of the overthrust belt. In this geologic province, the rock layers have been compressed from the west to the east, which resulted in extensive folding of the rock layers and caused thrust faults, where older rock layers have been pushed up over the top of geologically younger rock units. Generally, rocks exposed at the surface in the overthrust belt range in age from late Mississippian through early Cretaceous (about 320 – 90 million years old). The southern and western portions of the Forest lie within the northern part of the Basin and Range physiographic province. In these areas, the rocks are generally not so geologically contorted and broken up as in the overthrust belt. The individual mountain ranges are bounded on the sides by large faults, which dropped the valley floors relative to the mountains. Most rocks in this section range in age from the late pre-Cambrian through Permian (about 700 – 250 million years old) with some Miocene and Pliocene (about twenty to two million years old) age rocks, mainly north of Malad City.

Most of the bedrock units exposed in the Forest are sedimentary rocks, the bulk of which were deposited on the floors of ancient oceans present in the area in the geologic past. Rock types associated with this type of depositional environment are generally limestones, dolomites, siltstones, shales, and sandstones. When oceans were not present in the area, the sediments deposited were usually preserved as sandstones, siltstones, mudstones, and conglomerates. Some of the sedimentary environments represented by these rocks have been conducive to the preservation of important fossil resources. Some of the limestone units also contain caves, some of which have openings to the land surface.

After these sedimentary rock layers were deformed by the earth's geologic forces, igneous materials intruded and uplifted the Caribou Mountain area. Later, volcanic activity on the Forest and to the west caused layers of ash to accumulate and lava to extrude onto the surface, as evidenced by ash deposits and basalt and rhyolite flows on the Forest. Lastly, glaciation, weathering, erosion, and deposition have left a mantle of unconsolidated sediments covering much of the surface of the Forest. The geologic history and paleoenvironment of southeast Idaho have been interpreted from the rock types, geologic structure, mineral resources, fossils, and geologic resources found on the Forest today, as discussed briefly below.

MINERAL RESOURCES--LEASABLE

PHOSPHATE

The vast phosphate deposits actively being mined on the Forest were originally deposited on an extensive, shallow ocean floor. These phosphate containing sediments were eventually buried by other sediments, changed into stone (lithified), and later exposed at the earth's surface by the thrusting, faulting, folding, and erosion of the earth's crust in this area. The folding and thrusting exposed the phosphate beds in long linear deposits that parallel the geologic structure of the area.

The western phosphate field, which contains the phosphate deposits on the Forest, covers a large area of the western United States, with deposits in Montana, Idaho, Wyoming, and Utah. Minor amounts also are present in Colorado and Nevada (Service and Popoff, 1964). The thickest and richest (highest grade) surface and near-surface deposits in the field are located in southeast Idaho, much of which is located within the boundaries of the Caribou National Forest. Reserves in the southeast Idaho portion of the field were estimated by the US Geological Survey to be more than one billion tons (Gulbrandsen and Krier, 1980).

Phosphate was discovered in Idaho in 1889 by prospectors looking for gold, and was first mined on the Forest in 1907. Initially, mining used underground methods, but in the 1940s surface mining began. At first, annual production was relatively small and was measured in the hundreds of tons of phosphate rock. Continuous mining started on the Forest in the early 1950s, mainly because surface-mining methods greatly increased production while reducing costs.

Phosphate rock is a non-renewable, non-recyclable natural resource that is used primarily in the production of fertilizers. Elemental phosphorous, also extracted from phosphate rock and produced in southeast Idaho, is a critical component of numerous products. The United States is currently the world's leading producer and consumer of phosphate rock, yet it only contains about 8.5 percent of the world's reserve base (U.S. Geological Survey, 2002). In 2000 and 2001, phosphate produced from Federal leases on the Forest accounted for about 3.4 percent and 4 percent, respectively, of total world production (U.S. Geological Survey, 2002; Cundick, pers. comm. 2002).

Since the 1950s, phosphate production, in general, has increased continuously. In 2001, about 5,130,000 tons were produced from southeast Idaho, which was fifteen percent of the total U.S. phosphate production that year (U.S. Geological Survey, 2002). Production from Federal leases in 2001 from the Forest was about 4,800,000 tons (Jeff Cundick, personal comm., 2002). The percentage of total U.S. production coming from southeast Idaho is expected to increase in the future as reserves in Florida are depleted (Jasinski, 2000). The Minerals Management Service (2002) reported that revenues from phosphate-related activity in Caribou County, Idaho on Federal leases for Fiscal Year 2001 were almost $9.34 million with about 90 percent of that generated from the Forest (Minerals Management Service, 2002). Royalties and other revenues collected from Federal Phosphate leases are split equally between the state where the activity occurs and the Federal Treasury.

Phosphate deposits on federal lands are managed under the 1920 Mineral Leasing Act, as amended, and Federal Regulations at 43 CFR, Part 3500. Under this act and these regulations, the Bureau of Land Management (BLM) is the designated federal agency having the authority to issue or modify Federal Phosphate Leases and/or approve exploration and development activities on those leases, including the approval of mining and reclamation plans. Where National Forest System (NFS) lands are involved, the Forest Service provides the BLM with formal recommendations for lease issuance and development proposals, but the final authority for approval belongs exclusively to the BLM. Although the BLM is required to consult with the Forest Service, they are not required to accept Forest Service recommendations. Conditions of approval and/or mitigation measures to be applied to the leases or operations are determined through an environmental analysis process. When the BLM issues a Federal Phosphate Lease, it conveys to the lessee the exclusive rights to explore for and extract the phosphate resources contained in the lease, subject to existing laws and regulations.

The Forest Service issues Special Use Permits for those portions of the operations that lie on National Forest System lands outside lease boundaries. Off-lease mine related Special Use Permit facilities could include portions of haul roads, power lines, communication sites, or drainage control structures. Permanent disposal of phosphate mine overburden waste rock products is no longer permitted on Forest Service Special Use Permits (36 CFR 251.54).

Currently, all or portions of forty-six Federal Phosphate Leases exist on the Forest, covering about 25,000 acres, or about 2 percent of the total Forest acres. About 14,000 additional acres, or 1 percent of the total Forest acres, of unleased Known Phosphate Lease Areas (KPLAs) lie on National Forest System (NFS) lands within the Forest. A KPLA is land known to contain phosphate deposits that has been formally classified by the U.S. Geological Survey as subject to competitive leasing for any federally owned phosphate involved. The eight KPLAs in southeast Idaho include a mixture of Federal, State, and private surface and mineral ownerships, totaling about 80,000 acres. Portions of four of the KPLAs lie within the Forest boundary. About 8,400 acres of leased NFS lands, or about one-third of the lands leased on the Forest, have been mined out or are currently being mined. An additional 1,800 acres of leased NFS lands are in approved mine and reclamation plans or in the site-specific environmental analysis stage of permitting. Pending lease modifications, exploration licenses, and prospecting permit applications affecting more than 1,000 acres lie within the Forest. Some of these applications could result in new leased acreage.

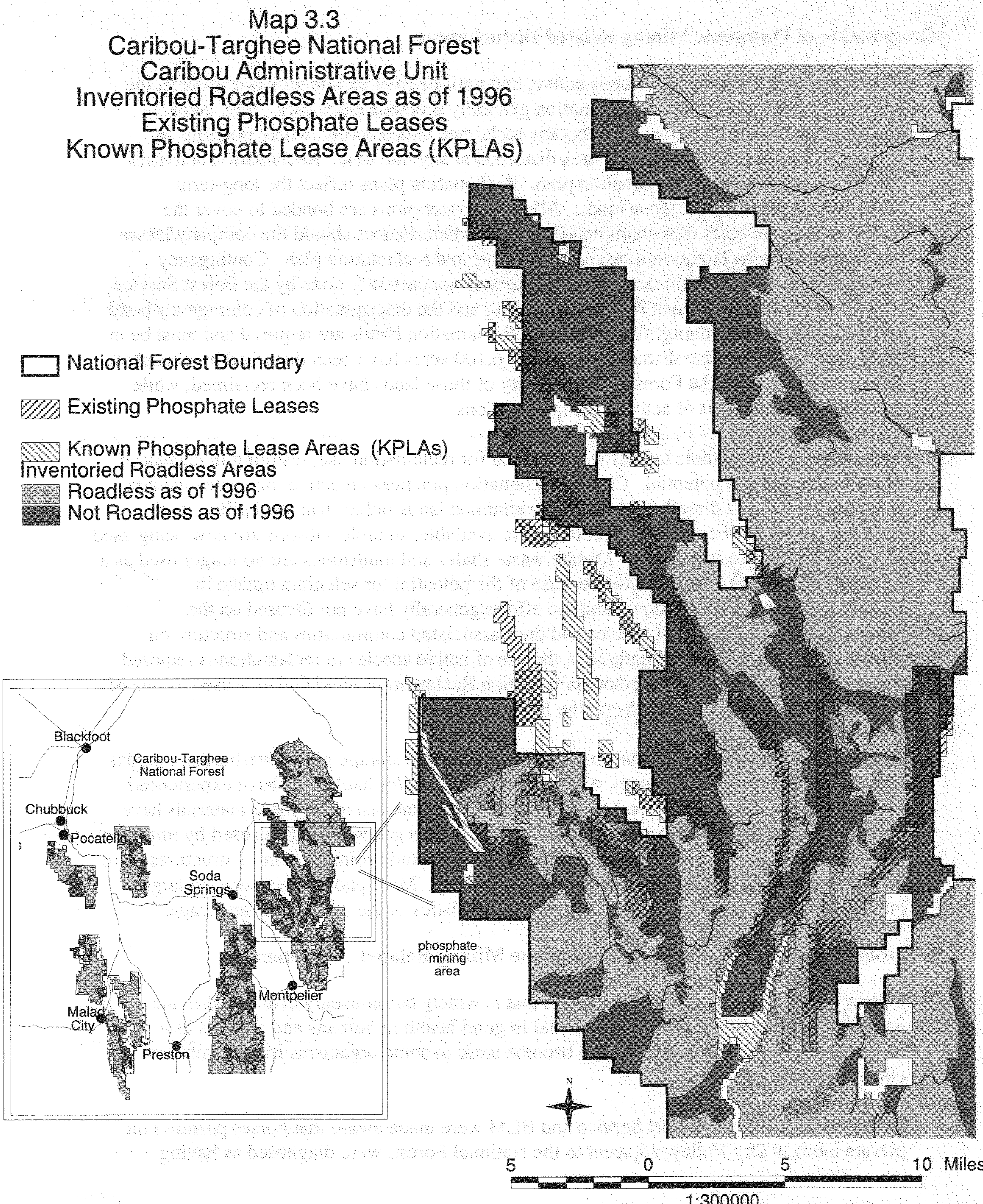
Phosphate mines follow the long, linear surface outcrop pattern of the phosphate deposits. Because of this outcrop pattern, a typical phosphate mine pit is several hundred feet wide, 200-400 feet deep, and may continue for miles along the strike of the deposit. Currently, the Forest Service and Bureau of Land Management require the mining companies to use overburden materials to backfill most of the mined- out pit. The mines usually have associated external overburden rock waste dumps, because the swell factor caused by mining the overburden material exceeds the pit capacity. In addition, overburden material must be placed somewhere when mining is started in a new area, because there is no pit available to backfill at that time.

The majority of the phosphate deposits of the Forest are scattered throughout the Webster Ridges and Mountains subsection. The landscape of this subsection contains steep, rugged, mountainous, and sometimes undeveloped country. Several inventoried roadless areas are found within this and the surrounding subsections. Nearly 10,800 acres of Inventoried Roadless Areas are covered by existing Federal Phosphate Leases, of which approximately 2,000 acres have already been mined. Approximately 8,800 acres of unleased KPLA lands are located currently within Inventoried Roadless Areas boundaries.

Phosphate mining and processing are key components of the southeast Idaho and Star Valley, Wyoming economy, especially in Caribou County, Idaho. Three phosphate mines currently operate on the Forest. A fourth mine adjacent to NFS lands will begin mining on the Forest in the near future under an already approved mine/reclamation plan. Direct employment at the phosphate mines and processing facilities in southeast Idaho was over 2,100 in 1998, with an estimated total payroll of over $110,000,000.00 that year, although direct employment and payroll were less in 2002.

Phosphate reserves on public and private land in southeast Idaho are sufficient to sustain current production levels into the foreseeable future. Only one phosphate processing facility produces elemental phosphorus in the US; it is located in southeast Idaho and is currently supplied exclusively with phosphate rock from mining operations within the Forest boundary. Phosphorus is a necessary element in a variety of everyday products. Three other major phosphate-processing facilities are located in southeast Idaho, and they depend entirely on production from mines on, or soon to be on, the Forest; these plants produce phosphate fertilizers and/or purified phosphoric acid.

As with all economic enterprises, the future of southeast Idaho phosphate mining and processing are dependent on the profitability of the operations. The question of profitability encompasses the total range of costs associated with mining and processing the ore (including addressing all environmental concerns) and delivering the end product to the various customers. It also includes consideration of international production and market conditions.


Map 3.3
Caribou-Targhee National Forest
Caribou Administrative Unit
Inventoried Roadless Areas as of 1996
Existing Phosphate Leases
Known Phosphate Lease Areas (KPLAs)
National Forest Boundary
Existing Phosphate Leases
Known Phosphate Lease Areas (KPLAs)
Inventoried Roadless Areas
Roadless as of 1996
Not Roadless as of 1996
Blackfoot
Caribou-Targhee
National Forest
Chubbuck
Pocatello
Soda
Springs
Montpelier
Malad
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Reclamation of Phosphate Mining Related Disturbances

During the time a phosphate mine is active, and until its final reclamation is complete, the use of the land for mining and reclamation generally preclude other uses. NFS lands disturbed by mining activities are generally reclaimed concurrently, where possible, as mining progresses, minimizing the area disturbed at any one time. Reclamation activities follow an approved mine/reclamation plan. Reclamation plans reflect the long-term management direction for those lands. All mining operations are bonded to cover the anticipated actual costs of reclaiming all proposed disturbances should the company/lessee not complete the reclamation required in the mine and reclamation plan. Contingency bonding to cover possible unanticipated impacts is not currently done by the Forest Service, because justification for such bonding is lacking and the determination of contingency bond amounts cannot be meaningfully estimated. Reclamation bonds are required and must be in place prior to any surface disturbance. About 6,100 acres have been disturbed by phosphate mining operations on the Forest. The majority of those lands have been reclaimed, while most of the rest are part of active mining operations.

In the past, not all suitable topsoil was salvaged for reclamation use, resulting in decreased productivity and site potential. Current reclamation practices on active mine sites include stripping topsoil and directly placing it on reclaimed lands rather than stockpiling it, if possible. In areas where insufficient topsoil is available, suitable subsoils are now being used as a growing medium for plants. Middle waste shales and mudstones are no longer used as a growth medium on reclaimed sites because of the potential for selenium uptake in reclamation vegetation. Past reclamation efforts generally have not focused on the establishment of native plant species and their associated communities and structure on disturbed sites; however, an increase in the use of native species in reclamation is required today. The Forest Service Intermountain Region Reclamation Field Guide is used as one of the guides for reclamation efforts on the Forest.

Reclamation activities also occur on the mine overburden storage piles (overburden dumps) and haul roads. In a few instances, overburden dumps and/or haul roads have experienced instability in the form of slumps and debris flows. In some instances, these materials have flowed into drainages with running water. These failures generally were caused by improper construction and/or over-saturated conditions. Barriers and sediment control structures were installed to prevent additional impacts to water quality. Most phosphate mines are large enough to change the landform and visual characteristics of the immediate landscape.

Hazardous Substance Release from Phosphate Mining Related Disturbances

Selenium is a naturally occurring element that is widely but unevenly distributed in the natural environment. Selenium is essential to good health in humans and animals as a micronutrient but can accumulate and become toxic to some organisms in relatively low concentrations.

In December 1996, the Forest Service and BLM were made aware that horses pastured on private lands in Dry Valley, adjacent to the National Forest, were diagnosed as having

selenium (Se) poisoning. Water for the horses and irrigation for the pasture where they fed for several years came from Maybe Creek. Testing revealed that the water in Maybe Creek exceeded clean water standards for Se, and that a large, phosphate mine overburden dump in Maybe Canyon was the source of the contamination. After closer inspection, it was discovered that water coming from another phosphate mine overburden dump in Pole Canyon also had elevated Se levels. This raised the concern that other phosphate mining related disturbances in southeast Idaho might also be releasing Se at unacceptable levels. A selenium working group, comprised of representatives from appropriate Federal and State regulatory agencies and the phosphate industry, was formed to determine the extent of the elevated Se. Other metals were later included in the studies to determine if they are also being released in unacceptable quantities, or if they could be eliminated from further study.

An initial interim hydrologic study completed in the fall of 1997 showed background Se levels on the Forest to be well below all regulatory standards. Water quality sampling conducted at active and historic phosphate mine sites found that surface water had selenium concentrations above background levels at 70 percent of the sites sampled (Montgomery Watson, 1997).

Although the following discussion specifically mentions selenium, the principles are generally applicable to other hazardous substances, as well. The problem has basically been traced to the exposure of certain mine waste rock (Middle Waste Shale) to increased oxidation. When the shale material is mined, it breaks up and is placed in overburden dumps. This exposes the shale material to a greatly increased oxidation rate compared to what happens when the rock remains undisturbed in the ground. This oxidation process can change the chemical state of some of the elements present in trace amounts to a water-soluble form. Then when rain and/or snowmelt water percolates through the overburden dump, it dissolves some of the water-soluble mineral compounds. These waters can then acquire a concentration of dissolved material that may exceed state and/or federal water quality standards. These waters with elevated dissolved solids can then enter the surface water system or filter into the groundwater system. Elevated levels of selenium and other hazardous substances in the surface water can be ingested directly by living organisms.

Another pathway that selenium can take that leads to accumulation in living organisms, and one that appears to pose a greater risk to some animals, is when plants that live on or near the waste dumps absorb water that is contaminated. Some plants ten to accumulate the Se present in the water they take into their tissues. Se poisoning can occur if animals eat selenium-accumulating plants, especially over a prolonged period of time. Some animals, such as sheep and horses, are much more sensitive to elevated Se than other animals, and poisoning is more likely. This is what happened to the horses that pastured in the area below the Maybe Canyon waste dump. Severe selenium poisoning, as documented in other areas, can cause deformities or even death. Milder cases of poisoning can cause hair loss, hoof softening, reduced reproductive success, and liver and/or organ damage (Selenium Area-wide Advisory Committee, pers. comm., 2001).

Selenium has been shown to have detrimental effects on livestock and wildlife in other regions of the country. Other than the poisoned horses mentioned previously, it is not yet

completely known or established to what extent Se has affected wildlife, fish, livestock, soils, and vegetation in southeast Idaho. Selenium has been implicated, directly and indirectly, in the cause of death to sheep feeding on or near past phosphate mining disturbed areas.

Since the initial 1997 study, much more comprehensive investigations have been and are being conducted. Studies to measure selenium and other contaminants in the water, soils, and vegetation associated with phosphate mines in southeast Idaho have been and are being conducted. Other studies that have been and are being conducted include: bird egg Se concentration; fish deformity rate, body Se accumulation, growth rates, and reproductive success; elk liver Se concentrations; and sheep and cattle grazing studies. The results from most of these studies have not been published in final form and that information is not included here. However, preliminary data tend to indicate there is not a significant potential hazard to human health associated with the release of Se or other hazardous substances from phosphate-related mining sites in southeast Idaho. Recently, however, an advisory was issued for fish consumption in East Mill Creek for children under the age of seven (Idaho Department of Health and Welfare, letter 11/8/02).

Many unanswered questions remain concerning the management of Se and other metals found in waste rock generated by phosphate mining. Although the basic chemical processes that liberate selenium are generally understood, the complete mechanisms for its release, transportation, and possible concentration in the environment are still uncertain and unknown (Selenium Area-wide Advisory Committee, pers. comm., 2001).

Active Mining Sites

Since the discovery that the release of Se at phosphate mine sites was an environmental concern, many changes to accepted mining and reclamation methods have been implemented. It must be noted that these methods are unproven. Monitoring and evaluation are not complete. The methods discussed below are theoretical at this time. These modifications include, but are not limited, to the following:

Increased amount of pit backfill. Much more of the mine overburden waste rock is now placed back into the mined-out pits. With less Se bearing rock material in external waste dumps, less material is available for water to percolate though that dissolves Se and releases it to surface waters as contaminated discharge.

Caps to overburn dumps and pit backfill. Mine companies have started using thick layers of non-seleniferous material to cap dumps and pit backfill (Dry Valley Mine, FEIS, 2000). This thick layer of material provides a growth medium for reclamation vegetation that does not contain elevated levels of Se, thus eliminating or greatly reducing the amount of Se available for plant uptake. This practice greatly reduces or eliminates the potential for Se to enter the food chain by primary plant ingestion. Some of the caps used also contain an impervious layer to prevent rain and/or snowmelt water from percolating down through the site and coming into contact with the waste material. This encapsulates the Se-bearing material so that soluble forms of Se do not come into contact with water, thus preventing it from being dissolved and transported from the site.

Changes to reclamation plant seed mix. Certain plants have a greater ability to absorb and concentrate Se and other potentially hazardous materials into their tissues. By eliminating known Se accumulators from the reclamation seed mix, less Se is available to livestock and wildlife. The use of plant species in reclamation with shallow root systems also will help to ensure that the roots do not grow through the non-seleniferous caps and come into contact with potentially Se-bearing materials. This will help ensure less Se is available to animals feeding on reclaimed lands.

Closing of reclaimed lands to sheep grazing. Because sheep are known to be more sensitive to elevated Se levels, they have been excluded from grazing on past mining disturbed lands where higher concentrations of Se could be present.

Dilution of potentially polluted groundwater. One project is being implemented that proposes to mix water going into the groundwater system that may have elevated Se levels with clean runoff water to dilute the contaminated water. Modeling indicates that the discharged groundwater will be within regulatory standards (Smokey Canyon Mine, Panels B & C, Supplemental FEIS, 2002).

These mining and reclamation methods are being and will continue to be carefully monitored by the mining companies, with regulatory oversight, to ensure that the methods used are successful in achieving their intended results. The mining industry is responsible for meeting appropriate water quality standards. If for some unforeseen reason exceedances occur, the mining industry will be responsible for any cleanup and/or remediation.

One of the purposes for the Selenium Area-wide Advisory Committee studies is to develop management practices to help reduce the risk of Se and other metal releases and associated impacts from current and future phosphate mining operations. Initial management practices have been developed and implemented on the Forest, including those mentioned above. They are continually monitored, evaluated, and refined as appropriate. The extensive testing, monitoring, and evaluation necessary to determine the effectiveness of these management practices will take time. The geochemical variability within the waste rock and the site-specific conditions at the individual mine sites may require different management practices be applied at the various mines or under certain environmental conditions. Updated management practices are being implemented at active mining operations. As data become available and management practices are refined, they will continue to be incorporated into development plans at future mine sites and used, as appropriate, to modify existing operations. Expanded monitoring at existing and future mine sites will aid in the refinement of existing management practices.

Cleanup of Existing Sites

The Forest Service is managing the South Maybe Canyon site with Comprehensive Environmental Response and Compensation Liability Act (CERCLA) authorities provided in Executive Order 12580. Plans and orders are under development to investigate releases at seven additional sites under the same authority. An Engineering Evaluation and Cost Analysis (EE/CA) will be prepared for each site once the investigation is completed to

develop action alternatives to remediate identified releases. Applicable Relevant and Appropriate Requirements (ARARs) will be used to establish remedial action levels.

CERCLA actions are outside the scope of the Forest Plan Revision. However, the standards and guidelines developed here will be evaluated as ARARs are incorporated as appropriate into remedial alternatives. Monitoring will be implemented at each site to determine remedial success. Subsequent actions may be necessary at those sites where remediation is not successful.

Oil and Natural Gas

Sedimentary deposits that accumulate at the bottom of the ocean, given enough time and the right geologic conditions, often become an important source rock for oil and/or natural gas. Petroleum products from these source rocks generally migrate upward and laterally through the geologic strata until they encounter a structure that acts as a trap, or to the surface where they dissipate. If these hydrocarbons encounter a trap that is sufficiently large, "pools" of oil and/or natural gas can develop in the pore spaces in the rock that have economic value. The permeability and porosity of "reservoir" rocks also play a major role in the extraction and economics of oil and gas reserves development.

Several exploratory oil/gas wells have been drilled on the Forest, but none of these was capable of producing hydrocarbons in economic quantities. Even though no producing wells are present on the Forest, the potential exists for accumulations of oil/gas. Parts of the Forest lie within the "overthrust belt," a geologic "structure" that produces large quantities of oil and gas in the adjacent states of Wyoming and Utah. The block faulting associated with the Basin and Range portions of the Forest have the potential to create structural traps that also could contain deposits of oil and/or natural gas. This gives portions of the Forest a probable high potential for the occurrence of oil/gas (BLM, 1988). This 1988 BLM assessment of oil and gas potential on the Forest and surrounding area is outdated and needs revision. Despite the possible high potential for the presence of oil and gas on the Forest the infrastructure necessary to commercially produce oil is basically lacking in southeast Idaho.

As with phosphate, oil and natural gas are regulated as leasable minerals. Only the BLM can issue oil/gas leases for National Forest System (NFS) lands. However, unlike phosphate, the BLM can issue oil/gas leases or approve operations for the leases on NFS lands only with the consent of the Forest Service. Oil and gas leases covered almost every available acre of the Forest in the early 1980s. Conversely, since the mid 1990s, there have been no oil/gas leases on the Forest. Although oil/gas related geophysical exploration was very wide spread in southeast Idaho in the 1980s, no drilling or other form of exploration has been conducted on the Forest during the 1990s. In the last ten years only two expressions of interest in oil/gas leasing have been received by the BLM for lands on the Forest, neither of which resulted in the issuance of leases, even though some of the lands were made available at a BLM lease sale offering.

The existing Forest Plan allows for oil/gas leasing, but changes in regulations and policy connected with oil/gas leasing since the Forest Plan was completed in 1985 require additional environmental analysis before leasing consent can be given for National Forest System lands.

Although the absence of oil/gas leases on the Forest does not preclude seismic or other geophysical exploration from occurring, most petroleum companies prefer not to invest in exploration unless they own or control existing leases.

National Energy Plan

In May 2001 President George W. Bush issued an Executive Order (E.O. 13212) to expedite the processing of energy-related projects. A National Energy Plan was developed that included recommendations to various agencies on how to expedite energy-related projects. Based on the National Energy Plan, the Forest Service developed an Energy Implementation Plan. The Implementation Plan has several components, most of which are not particularly applicable to the Caribou NF at this time. A brief review of these components is described below.

Water Energy. This section of the Implementation Plan addresses permitting and interagency cooperation. Because of the lack of large rivers, lakes, and dams on the Forest, only very small and nationally insignificant projects are even possible on the Forest.

Fossil Fuels and Geothermal Energy. This section of the Implementation Plan addresses issues relating to the leasing and permitting of these types of operations. The Forest has no known coal development potential, and essentially, no geothermal development potential. There have been no oil and gas leases on the Forest for the past ten years, with virtually no expression of leasing interest during that same time period.

The National Energy Plan identified five "priority areas," and the Forest Service Washington Office Energy Implementation Plan identified ten priority National Forests from within those areas. The Caribou NF is not included in either of these priority areas. Because of the lack of infrastructure for oil and gas development, limited industry interest, the lack of known or proven reserves on the Forest, and the lack of required leasing analyses, the Caribou NF is not a high priority Forest for additional action at this time.

Biomass and Bioenergy. The items identified in this section of the Implementation Plan generally are not applicable to the Forest, but focus more on the national level. This section also deals with small diameter and underutilized wood.

Infrastructure, Research, and Technology Transfer. Most of these items relate to activities and coordination to be carried out at the national level, no at the local Forest level.

The Intermountain Region's direction regarding the Forest Service Energy Implementation Plan states, in part:

"For areas without leasing decisions and expressed interest, we need to identify resource needs (funding and staff) and timeframes for completing the analyses necessary to make

those lands available…we must ensure that all restrictions are reasonable and justifiable to minimize future needs to revise or amend forest plans or leasing analyses."

Forest resource specialists reviewed the National Energy Plan and the Forest Service Implementation Plan. Since the Forest has no or minimal "expressed interest," and there are no "restrictions" (because of the lack of environmental analysis to allow leasing), the Regional direction is not particularly pertinent to the Forest at this time. The Forest will initiate any necessary environmental analyses when or if the demand arises.

Geothermal Resources

Although several geothermal leases have been issued in the past, none have existed on the Forest in the past fifteen years. A few warm springs exist in portions of the Forest, but none of these apparently has sufficient temperatures to justify development of this resource. In the past, portions of at least one Known Geothermal Resource Area (KGRA) existed on the Forest. All KGRAs in eastern Idaho have now been revoked (Phelps, pers. comm., 2002). No geothermal exploration or leasing is anticipated during the planning period.

PRECIOUS METALS AND OTHER LOCATABLE MINERALS

Gold

Minerals that are deemed locatable under existing laws and regulations include precious and other metals, gemstones, some industrial minerals, such as perlite, and uncommon varieties of stone, such as very pure limestone. Locatable mineral administration is subject to the general mining laws of 1872, as amended, and the regulations that have been developed to implement these laws. NFS lands are open to prospecting and the staking of mining claims unless the lands have been formally withdrawn from mineral entry under the general mining laws of 1872. Locatable mineral operations are subject to existing laws and regulations, including the National Environmental Policy Act (NEPA).

Mineralization occurred with the intrusion of igneous material into what is now Caribou Mountain. Gold (with some associated copper, silver, iron, and other minerals) was among the minerals that were deposited in the area. In the late 1800s, a gold rush occurred in the Caribou Mountain area, and a moderate amount of gold was recovered. Mining activity has continued sporadically since that time. Even as late as 1959-1960, a gold dredge operated in portions of McCoy Creek (Rains and Federspiel, 1993). Most of the gold production in the Caribou Mountain area was from placer (stream and/or glacial) deposits, although some underground mining occurred. Stamp mills were constructed on Caribou Mountain for the processing of ore from the underground mines. Hundreds of acres were hydraulically mined, which removed the soils and subsoils down to bedrock in many areas. Although several placer claims still exist in the area with a few small placer Plans of Operation, most current activity includes panning, small suction dredging, or small sluice box operations. Only very minor amounts of gold are currently being recovered.

In the Caribou Mountain area, both McCoy Creek and Tincup Creek and their tributaries are currently closed to the Idaho Department of Water Resources one-stop permit system. This permit system is issued by the State of Idaho for the operation of small suction dredges on streams not closed as a result of resource, legal, or other concerns. Although the one-stop State Permit does not relieve the operator of the obligation to file a Notice of Intention to Operate with the Forest Service, the intent is that small-scale suction dredging on streams open under this permit will not cause impacts that alter quality, stream channels, beds or banks, or aquatic resources. Streams that are closed under the one-stop permit are still available for locatable mineral activities, unless they are withdrawn from mineral entry. Proposed suction dredging on these closed streams require the submission of a more detailed State of Idaho/U.S. Corps of Engineers Permit, and typically, a Forest Service Plan of Operation.

Other Metals

Although trace amounts of gold have been reported in other areas of the Forest, copper, with smaller amounts of lead and silver, is the most abundant potentially economic metal. About 10,000 pounds of copper was produced from the Caribou Mountain area in the first half of the 20th century (Rains and Federspiel, 1993). Other small prospects are scattered around the Forest, but none of these have produced significant amounts of metals. Most of this prospecting work was done in the first half of the 1900s. No active operations for non-gold metals are occurring on the Forest at this time.

Abandoned Mined Lands (Non-Phosphate)

Several small abandoned metal mining prospects and operations are present on the Forest, most from the earlier part of the 20th century. These disturbances sometimes include open adits and shafts, generally located near mineralized zones along faults and fractures in the rocks. Some of these mine openings have collapsed over time and naturally closed themselves; others have been closed by the Forest Service in recent years to prevent human entry, because of potential safety hazards associated with abandoned, underground mine workings. Some of these old, open, abandoned mines/prospects provide important habitat for cave-dependent wildlife species. To prevent the loss of this important habitat, the closures have included grates that allow continued airflow and access for bats and other small animals but prevent human entrance.

Perlite

Associated with the volcanic rocks on the north end of the Elk Horn Mountains (north of Malad City) are deposits of perlite, pumice, and pumicite. An active pumice mine is currently operating just outside the Forest boundary in this area. Perlite, a volcanic glass containing water, expands when heated. The expanded or "popped" perlite is used as a soil additive and "filler" in industrial aggregates. It is lightweight and has good insulating properties.

Many existing perlite claims are present on the Forest, as are several patented claims. Mining has occurred on the patented claims (private land) within the Forest boundary, but

only in minor amounts since 1992. A proposal for the mining of perlite from the patented claims with a small segment of the transportation route on NFS lands is currently being considered. The potential exists for future development of perlite deposits, both on private land and the surrounding mining claims on NFS lands. Many of the claims, however, have recently been declared closed by the Bureau of Land Management (BLM, letter 11/13/02).

LIMESTONE

Limestone is generally considered a common variety of stone and is not locatable under the 1872 mining law. However, if it is pure enough, limestone has been determined to be a locatable mineral in some instances. Chemical Lime Company, with a processing facility near Soda Springs, Idaho, used some of the relatively pure limestones of the area for the production of lime. The plant is currently idle, but the company has several limestone claims on the Forest; however, because they own sufficient patented reserves near the plant, it is unlikely that limestone from the Forest will be mined for processing at this facility.

SALABLE MINERALS

Saleable minerals, referred to as mineral materials or common variety minerals, include sand, gravel, clay, and common varieties of stone. Deposits of sand, gravel, and stone (used for road building, other construction, decorative purposes, or landscaping) are present in scattered locations around the Forest. Some of these deposits have been developed for use by the Forest Service, State and County road departments, and for private use. The Forest Service regulates the disposal of these materials through a permit system. Because similar deposits generally occur outside of the National Forest boundary and because current demand is relatively low throughout southeast Idaho, the need for these materials from the Forest is not great at this time.

GEOLOGICAL RESOURCES

PALEONTOLOGY (FOSSILS)

The Forest contains numerous and diverse fossil resources. Some aspects of this non-renewable resource are rare and are scientifically very significant. Current research is occurring.
The only dinosaur fossils reported from the entire state of Idaho have been found on the Caribou NF. These dinosaurs and associated animals are early Cretaceous in age (120 million to 90 million years old). Early Cretaceous terrestrial faunas are relatively rare worldwide. Although only a few types of dinosaurs have been reported in the scientific literature from Idaho (Dorr, 1985), recent finds on the Forest have significantly increased that number (Weishample, *et al*, 2002). Dinosaur eggshell fragments have also been found at several localities, although no whole eggs or nests have been discovered to date.

Rocks of about the same age as those that have yielded the dinosaur remains in Idaho also contain portions of other scientifically important fossils, such as crocodiles, lizards, turtles,

fish, sharks, and plants (conifers and ferns) with a potential for mammals. A relatively high potential exists for the discovery of additional dinosaur and other important fossil specimens from these early Cretaceous rocks.

Other significant fossil resources on the Forest include sharks and fish remains associated with the phosphate deposits, and other vertebrates and plants found in the more recent deposits of volcanic ash and in unconsolidated Pleistocene (Ice Age) sand and gravel deposits.

More common fossils found on the Forest include marine invertebrates such as trilobites, corals, brachiopods, bryozoans, ammonoids, nautiloids, clams, snails, ostracods, echinoids, and crinoids. These invertebrate fossils are generally more common and widespread than are the vertebrates and plants. Because of their general abundance, they usually are considered less scientifically significant than are the more rare vertebrates and plants.

CAVES

Because of the great amount of limestone present on the Forest, some areas could have relatively abundant caves. These caves are of the solution cavern type, formed when slightly acidic surface and groundwater percolates down through fractures and faults and dissolves the limestone. A karst system is developed if enough of these caverns occur in a given area. Many of these caverns probably do not, as yet, have surface openings. Some of the caves with surface openings are widely known, others are known only to the spelunking community, while others await discovery. Minnetonka Cave is one of these well-known caverns with a surface entrance that has been developed for interpretive and recreational purposes. These caves provide important habitat for cave-dependant wildlife species and play an important role in the groundwater hydrology of the area.

Issue
6
Riparian/Wetland Areas and Aquatic Biota

Riparian/Wetland Areas

Analysis Scale: Forest-wide

Issue Statement:

Forest Plan Alternatives and management direction may affect the condition, function, and processes of watersheds, riparian, stream channels, aquatic habitat, fish populations, and water quality.

Issue Indicators:

♦ **R.1 Watershed integrity as defined in the Inland West Watershed Initiative (IWWI) and measured by percent of watersheds disturbed by alternative**

Baseline Indicator: **Low**

♦ **R.2 Riparian condition measured as relative protection by alternative**

Baseline Indicator: **Low**

♦ **R.3 Water quality measured as relative protection by alternative**

BACKGROUND TO ISSUE

Riparian/wetland areas, although limited in extent on the Forest, are highly productive, and as a result, receive more intensive use by both animals and humans. They provide important physical, biological, and chemical attributes that directly influence the quantity and quality of water and aquatic habitat.

The affected area for direct, indirect and cumulative effects is 1.1 million acres of National Forest System lands within the boundaries of the Caribou National Forest administered by the Caribou/Targhee National Forest.

Riparian areas have been impacted by human activities, such as mining, agriculture, urban expansion, and livestock grazing. Very few riparian areas within southeastern Idaho remain in an undisturbed condition. Disturbance has been direct and indirect. Direct disturbances modify the riparian area through mechanical, chemical, or biological means, such as grazing and beaver activity. Indirect changes occur through changes in stream flow regimes, which affect the amount and timing of available water for riparian vegetation. In the past, some believed riparian vegetation was a nuisance and attempted to eradicate it. Others believed riparian areas occupied precious acres that could be plowed, mined, or grazed. Other riparian areas were depleted by water diversions and lowered water tables. The result has been an overall departure from potential acreages and overall quality.

Current Conditions

The current condition of the watersheds within the Forest has been assessed by several different agencies at various scales using a variety of methods. Contributors include: the EPA, the Interior Columbia Basin Ecosystem Management Project (Interior Columbia Basin Draft Environmental Impact Statement and supporting documentation), Idaho Department of Environmental Quality (Blackfoot River, Bear River and Portneuf River Waterbody Assessments), the Forest (Inland West Water Initiative, Stream and Riparian Area Properly Functioning Condition Assessment, and Forest Plan and Project Monitoring).

Watersheds

EPA/USGS WATERSHED ASSESSMENTS

Analysis Scale: 4th HUC

EPA, in collaboration with the U.S. Geological Survey, has evaluated most of the watersheds within the United States at the 4th HUC scale (EPA 1998). They have characterized overall watershed condition and vulnerability through an Index of Watershed Indicators (IWI) to produce an overall assessment for each watershed. The goals of the IWI are to broadly characterize the condition of the watersheds; stimulate and empower citizens who will now have easy access to this aggregated information; provide a baseline for dialogue among water managers at all geographic scales; and help measure progress toward a national goal of healthy watersheds. It does not contain detailed, site-specific information, the final word on watershed assessment, or a template for a detailed watershed monitoring plan. The national data used in IWI are of varying quality, and entire watersheds are characterized regardless of land ownership or management responsibilities.

The following characterization reflects overall watershed characteristics, not just those lands managed by the Forest Service. Watersheds are placed into one of seven categories. Category 1 contains those watersheds with better water quality and lower vulnerability to stressors such as pollutant loadings. Conversely, Category 6 contains those watersheds with more serious water quality problems and higher vulnerability to stressors such as pollutant loadings. Category 7 includes those watersheds where insufficient data exists to make a call. Factors evaluated include water quality; agricultural and urban runoff; wetland values; hydrologic modification, such as dams; and atmospheric deposition (See Table 3.30.).

BEAR LAKE WATERSHED (16010201)

The watershed area contains about 1,240 square miles. Twenty-one percent of the land area is croplands. Nine rivers and streams were evaluated in this watershed, with about thirteen percent actually surveyed. Six miles were determined to meet all designated uses. The principal aquifer is basin and range carbonate-rock. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About forty-three percent of the riparian areas are

within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

MIDDLE BEAR RIVER WATERSHED (16010202)

The watershed area contains about 1,215 square miles. Thirty-nine percent of the land area consists of croplands. Eight rivers and streams were evaluated in this watershed, with about seventeen percent actually surveyed. Zero miles were determined to meet all designated uses. The principal aquifer within the watershed is basin and range with a rock type consisting of unconsolidated[23] sand and gravel. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About seventy percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

LOWER BEAR/MALAD RIVER WATERSHED (16010204)

The watershed area contains about 1,170 square miles. Forty-seven percent of the land area is croplands. Four rivers and streams were evaluated in this watershed, with about seven percent actually surveyed. Zero miles were determined to meet all designated uses. The principal aquifer within the watershed is basin and range with a rock type of unconsolidated sand and gravel. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About thirty percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

PALISADES WATERSHED (17040104)

The watershed area contains about 930 square miles. Five percent of the land area consists of croplands. Fifteen rivers and streams were evaluated in this watershed, with about two percent actually surveyed. Zero miles meet all designated uses. There is no principal aquifer within the watershed. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About seventy-five percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

SALT RIVER WATERSHED (17040105)

The watershed area contains about 925 square miles. One percent of the land area consists of croplands. Twelve rivers and streams were evaluated in this watershed, with about fourteen

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[23] **Unconsolidated** means having no specific form or structure; loosely arranged, not stratified (layered).

percent actually surveyed. One hundred two miles meet all designated uses. There is no principal aquifer within the watershed. The overall IWI for this watershed is "one," which means the watershed is in good overall condition with low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About ninety-seven percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

WILLOW CREEK WATERSHED (17040205)

The watershed area contains about 651 square miles. Nine percent of the land area consists of croplands. Twelve rivers and streams were evaluated in this watershed, with zero percent actually surveyed. Zero miles were determined to meet all designated uses. The principal aquifer within the watershed is Miocene basaltic-rock, which consists of basalt and other volcanic rock. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About seventy-five percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

BLACKFOOT RIVER WATERSHED (17040207)

The watershed area contains about 1,051 square miles. Forty percent of the land area consists of croplands. Twenty rivers and streams were evaluated in this watershed, with zero percent actually surveyed. Zero miles meet all designated uses. There is no principal aquifer within the watershed. The overall IWI rating for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About thirty-three percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients, and sediment.

PORTNEUF RIVER WATERSHED (17040208)

The watershed area contains about 1,304 square miles. Forty percent of the land area consists of croplands. Sixteen rivers and streams were evaluated in this watershed, with zero percent actually surveyed. Zero miles meet all designated uses. The principal aquifer within the watershed is basin and range with unconsolidated gravels and sand rock types. The overall IWI for this watershed is "five," which means more serious problems exist, but the land has a relatively low vulnerability to additional stressors such as pollutant loadings. A moderate level of wetland loss is estimated in the watershed. About twenty-six percent of the existing riparian habitat is within a forested setting. A moderate level of potential impact to water quality exists from agricultural runoff, which includes pesticides, nutrients and sediment.

Table 3. 44. Caribou SubBasin Watershed Condition and Vulnerability Based on EPA and USGS Ratings.(Includes all land ownership)

Information taken from EPA Surf Your Watershed Web site @ http://www.epa.gov/surf2/hucs (January, 25, 1999)

Descriptors USGS Cataloging Unit HUC Hydrologic Unit Code	**Bear Lake** 16010201	**Middle Bear** 16010202	**Lower Bear/Malad** 16010204	**Palisades** 17040104	**Salt** 17040105	**Willow** 17040205	**Blackfoot** 17040207	**Portneuf** 17040208
Area of subbasin in square miles	1238.24 sq. mi. (320,952 ha)	1,215.86 sq. mi. (315,151 ha)	1,171.03 sq. mi. (303,531 ha)	930.4 sq. mi. (241,160 ha)	925.84 sq. mi. (239,978 ha)	651.45 sq. mi. (168,856 ha)	1050.59 sq. mi. (272,313 ha)	1304.29 sq. mi. (338,072 ha)
USGS Condition Rating[1]								
·% surveyed meeting all uses	0-20%	0-20%	0-20%	0-20%	80-100%	0-20%	0-20%	0-20%
·% surveyed meeting drinking water designated uses	80%-100%	80%-100%	No data	80%-100%	80%-100%	80-100%	80-100%	80-100%
·Chemicals in surface water	No data	34	22	5	No data	6	No data	No data
·Chemicals in ground water	No data	No data	No data	No data	No data	No data	No data	No data
·Ambient water quality - [2] (Conventional pollutants)	No data	>25%	11%-25%	0%-11%	0%-11%	>25%	No data	11%-25%
·Overall wetland loss	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
USGS Vulnerability Rating[3]								
·Aquatic species at risk	2 to 5	1	No data	2 to 5	2 to 5	2 to 5	2 to 5	None
Agricultural runoff:								
Level of potential impact	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Potential pesticide runoff	Low	Moderate	Low	Low	Low	Low	Low	Low
Potential nitrogen runoff	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate
Sediment delivery to streams	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
·Hydrologic modification	No recorded dams	Moderate impoundment	Moderate impoundment	High impoundment	Low impoundment	Moderate impoundment	High impoundment	No recorded dams
USGS OVERALL WATERSHED RATING[4]	**5**	**5**	**5**	**5**	**1**	**5**	**5**	**5**

1 Condition indicators are designed to show existing watershed health across the country. These indicators include such things as water meeting state or tribal designated uses, contaminated sediments, ambient water quality, and wetland loss.

2 Monitoring of phosphorous, dissolved oxygen, ammonia, and pH

3 Vulnerability indicators are designed to indicate where pollution discharges and other activities put pressure on the watershed. These could cause future problems to occur. Activities in this category include such things as pollutant loads discharged in excess of permitted levels, pollution potential from urban and agricultural lands, and changes in human population levels.

4 Ratings are composites of condition and vulnerability indicators. A rating of 1 indicates watershed has better water quality, low vulnerability; 2 indicates watershed has higher water quality and higher vulnerability; 3 indicates watershed has less serious water quality problems and lower vulnerability; 4 indicates watershed has less serious water quality problems and higher vulnerability; 5 indicates watershed has more serious water quality problems and lower vulnerability; 6 indicates watershed has more serious water quality problems and higher vulnerability; 7 indicates insufficient data to make assertion of condition or vulnerability.

INTERIOR COLUMBIA RIVER BASIN ASSESSMENTS

Analysis Scale: 4th HUC

This assessment coarsely evaluated only those watersheds within the Pacific Northwest Region. No lands within the Bear River Basin were evaluated in this process.

Watersheds have been extensively altered throughout the entire interior Columbia Basin since European man settled the area. Alterations have come in the form of mining, timber harvesting, livestock grazing, homesteading, beaver trapping, dam construction, water diversions, and road building. As a result of these activities over time, the distribution of sediment, water, and vegetation has created changes in stream channels and the quantity and quality of aquatic and riparian habitat (USDA/USDI, 2000).

The following table summarizes the Forest, Range, Aquatic, Forest Hydrology, Range Hydrology and composite Ecological Ratings for 4th HUC watersheds within the Upper Snake River portion of the Caribou National Forest. "High" means the watershed was determined to be in a relatively high overall ecological condition. "Low" means the watershed was determined to be in a relatively low condition overall.

Table 3. 45. Composite Ecological Ratings for 4th HUC Watersheds on the Forest within the Upper Snake River.

Subbasin (4th HUC)	Forest	Range	Aquatic	Hydrology (Forest)	Hydrology (Range)	Composite Ecological
American Falls (17040206)	NR*	Low	Moderate	NR	Low	Moderate
Blackfoot River (17040207)	NR	Low	Moderate	NR	NR	Low
Palisades (17040104)	High	High	Moderate	High	NR	High
Portneuf River (17040208)	NR	Low	Moderate	NR	NR	Low
Salt River (17040105)	High	NR	Moderate	Moderate	NR	Low
Willow Creek (17040205)	Low	Low	Moderate	Moderate	NR	Low

* Not Rated

The general condition of evaluated watersheds in the table above is low to moderate, with some smaller areas remaining in high or "good" overall condition. As with the EPA analysis, these ratings include all lands within each of the watersheds, not just those managed by the Forest Service. These ratings reflect the impacts of agriculture and urban expansion, as well as timber harvesting, livestock grazing, road building, and mining.

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WATERBODY ASSESSMENTS

Analysis Scale: 4th HUC

The Idaho Department of Environmental Quality (DEQ), under direction in the Clean Water Act (CWA), has assessed the Blackfoot and Portneuf Subbasins for watershed impacts and water quality. Section 303(d) of the CWA requires all states to assess the quality of water within their boarders to determine if those waters meet minimum requirements for designated beneficial uses. If it is determined that a water body does not meet those standards, the state is required to develop Total Maximum Daily Loads (TMDLs)[24] for each identified pollutant. Waterbody Assessments have been completed for both of these watersheds. It should be noted that these assessments include all lands (Federal, State and private) within the watershed. TMDLs apply equally to all lands within the watershed in both public and private ownership. Implementation Plans for all the Blackfoot and Portneuf River basins are to be provided by the State of Idaho to EPA by fall 2002. These Implementation Plans will specify how the State intends to comply with TMDL standards and the monitoring that will be completed. The Caribou NF cooperates with the State in developing Implementation Plans for 303(d) streams within the National Forest System boundaries within each of the watersheds. To date, an assessment has not been completed for the Bear River watershed, and no TMDLs have been established.

BLACKFOOT RIVER WATERBODY ASSESSMENT

The Blackfoot Subbasin encompasses about 700, 000 acres and contains over 1,700 miles of rivers and streams. The Blackfoot River officially begins at the confluence of Diamond and Lanes Creeks and winds its way toward the Snake River about 130 miles downstream. The Blackfoot River flows into the Snake River near the city of Blackfoot. A major reservoir in the system, Blackfoot Reservoir, is located downstream of lands managed by the Forest Service. Subbasin elevation ranges from almost 9,000 feet near Dry Valley Creek to about 4,400 feet at the Snake River confluence. The subbasin geology is mostly of sedimentary origins. The upper Blackfoot River subbasin contains one of the largest reserves of phosphate rock in the United States and supports several large phosphate mines, both active and reclaimed. Blackfoot Reservoir substantially alters the timing and amount of streamflow below the dam where much of the water is diverted for crop irrigation; only a portion of the water generated in the watershed reaches the Snake River. In general, the upper watersheds are in an overall healthier condition than the lower valleys.

Specific criteria are set by the state to define water quality characteristics of a water body needed to support its designated beneficial uses. The criteria can either be numeric or narrative. If a waterbody does not meet these criteria, the state is required to identify the stream and its limiting factor(s) and report its findings to EPA. This process is outlined in

[24] **TMDLs** are the sum of the individual wasteload allocations for point sources (i.e. from a pipe), load allocations for nonpoint sources (i.e. from a field or roadway), and natural background. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. (IDAPA 58 Title 1 Chapter 02).

Section 303(d) of the CWA. Since 1996, when the first 303(d) list was generated by DEQ, several modifications to the list have been made. Some streams were added and deleted in 1998 and again in 2000. A revised list is due in 2002, but, to date, it has not been issued. Listed streams from the 2000 list that occur on lands within the Forest boundaries include Blackfoot River, Trail, Slug, Dry Valley, Angus, Lanes, Bacon, Sheep, Diamond, and Maybe Creeks; however, not all listed segments occur on National Forest System lands. Some listed segments occur below the Forest boundary. Sediment and nutrients are the two most recognized pollutants in the watershed.

Several subwatersheds have been heavily impacted by phosphate mining activities. Heavy metal releases, primarily selenium, from phosphate mining sites have recently been documented and are being delivered downsteam. Research is under way by a task group consisting of private, research, state and federal groups and agencies to determine how much selenium is actually being released, the effects heavy metal releases are having on the environment, what the maximum allowable criteria should be, and possible methods of controlling releases (IDEQ, 2000a). (See Minerals Section for a more detailed discussion.)

Portneuf River Waterbody Assessment

The Portneuf River is about 100 miles long from its headwaters to the confluence of the Snake River. The subbasin drains about 1,360 square miles. The geology of the area is mostly sedimentary with some basalt in the Bancroft area, along the lower reach of Marsh Creek and along the Portneuf River's main stem from Inkom to Pocatello. Underlying much of the subbasin are large deposits of gravel, a result of the draining of ancient Lake Bonneville into the Snake River Basin. Major mountain ranges within the area include Bannock Range to the west, Portneuf Range in the middle, and Fish Creek Range to the south. Chesterfield Range forms the eastern flank. The climate of the area is semi-arid. Annual precipitation averages twelve inches at Pocatello. Elevations within the subbasin range from 9,280 feet to 4,350 feet at the Snake River confluence. The gradient of the Portneuf River ranges from twenty-three feet per mile to six feet per mile in the lower reaches. Flows in the subbasin vary according to location but follow the general pattern of high spring flows and low summer, early fall flows. The diversion of water for irrigation affects flows throughout the irrigation season. Seepage to groundwater of nearly one hundred cubic feet per second (cfs) also occurs near Topaz and McCammon. Chesterfield Reservoir is a major diversion on the river. Other reservoirs are on Twentyfourmile Creek and Hawkins Creek, both tributaries to Portneuf River.

Human activities have had a significant impact on the main stem of the Portneuf River. In the lower river, a 1.5-mile concrete channel has been constructed through the City of Pocatello. This concrete channel resulted in the loss of more than four channel miles and nearly 150 acres of riparian habitat. Likewise, the upper Portneuf runs through a nearly eight-mile long canal constructed below Chesterfield Reservoir, which eliminated about sixteen miles (some estimates are as high as twenty-five miles) of channel and altered thousands of acres of wetlands. All the reservoirs, stream channelization, and most irrigation diversions occur primarily on private, or in some cases, Bureau of Land Management (BLM) lands outside the Forest boundary. In general, the upper watersheds, which are mostly inside the Forest boundary, are in a healthier overall condition than the downstream conditions.

Several water quality limited segments exist in the subbasin, which include the main stem of the Portneuf River, several tributaries, and one reservoir. All stream segments include sediment as a pollutant, and roughly half are listed for nutrients. The main stem of the Portneuf River also includes bacteria, flow alteration, and oil and grease as pollutants. The only listed segment (2000 list) within the Forest boundary is South Fork Hawkins Creek (IDEQ, 2000b). See Table 3.49 for a list of current 303(d) streams.

INLAND WEST WATER INITIATIVE

Analysis Scale
6th HUC

To provide effective stewardship of watersheds and aquatic systems into the 21st Century, the four Inland West Regions of the Forest Service initiated a process to provide basic soil, water, and watershed information on each of the affected Forests. The purpose of the initiative was to:

- Identify the probable condition of watersheds and aquatic systems at a consistent scale of resolution;
- Identify locations of critical water-dependent resource values at risk that need priority protection;
- Identify locations of damaged soil, riparian, and aquatic resource values that need to be restored; and
- Classify watersheds and aquatic systems to develop management programs and restoration strategies.
-

Over 150 subwatersheds have been assessed and rated on the Forest for geomorphic integrity, water quality integrity, and watershed vulnerability. Ratings of 1 to 3, with "1" being the best and "3" being the worst, were used for the assessment of each subwatershed in each of three categories. The protocol allows for a primary and secondary rating.

GEOMORPHIC INTEGRITY

A rating of "1" means the watershed has high soil and water integrity relative to its natural potential condition. Disturbance does not compromise soil-hydrologic function or soil-stream resilience. Criteria are: Soil-hydrologic function is estimated to be excellent or good throughout the watershed; AND All streams are estimated to be in dynamic equilibrium relative to their own potential; AND All riparain areas are estimated to be in properly functioning condition. A rating of "2" uses the same as Rating 1, except up to twenty percent of the rated elements may be degraded. A rating of "3" uses the same criteria as Rating 1, but more than twenty percent of the watershed may not meet the criteria.

WATER QUALITY INTEGRITY

A rating of "1" means no segment is damaged by physical, chemical, or biological impacts such that any resource value appears to be seriously degraded. A rating of "2" means a minor part (less than twenty percent) of segment miles is damaged such that resource values appear to be seriously degraded. A rating of "3" means a major part (greater than twenty

percent) of segment miles is damaged by physical, chemical, or biological impacts such that any resource value appears to be seriously degraded.

WATERSHED VULNERABILITY

A rating of "1" means a minor part (less than 20 percent) of the watershed is in sensitive lands. A rating of "2" meansa moderate (20-50 percent) of the watershed is in sensitive lands. A rating of "3" means a major part (>50 percent) of the watershed is in sensitive lands. Sensitive lands are defined as areas where disturbances pose a high probability of degrading watershed soil-hydrologic function. Sensitive lands include areas with highly dissected slopes, highly erodible soils; landslide deposits and potential landslide areas (USDA-FS, 1998)

Table 3. 46. Summary Findings of 6th field HUC Subwatersheds for the Caribou.

Rating	Watershed Vulnerability No. of Subwatersheds	Geomorphic Integrity No. of Subwatersheds	Water Quality No. of Subwatersheds
1 (Best)	4	1	1
1-2*	2	8	15
2-1	4	14	12
2	70	43	35
2-3	62	73	73
3-2	7	12	11
3 (Worst)	6	4	8

* Includes both the primary and secondary ratings. A "1-2" rating means the watershed has a primary rating of "1," but conditions exist within the watershed that tend to reduce its condition toward mid-scale; that is, the conditions are better than a "2" rating, but not quite good enough to rank among the best. Conversely, a "2-1" rating suggests the watershed is above mid-scale, but not as good as a "1-2" rating.

The majority of the ratings are within the "2" category when combined with the "2-1," "2," and "2-3" ratings. This suggests watersheds and stream channels throughout the Forest have been disturbed (generally twenty percent or less of each watershed area) but continue to function adequately and provide for favorable conditions for water flows, riparian and aquatic plants, fish, and wildlife habitat.

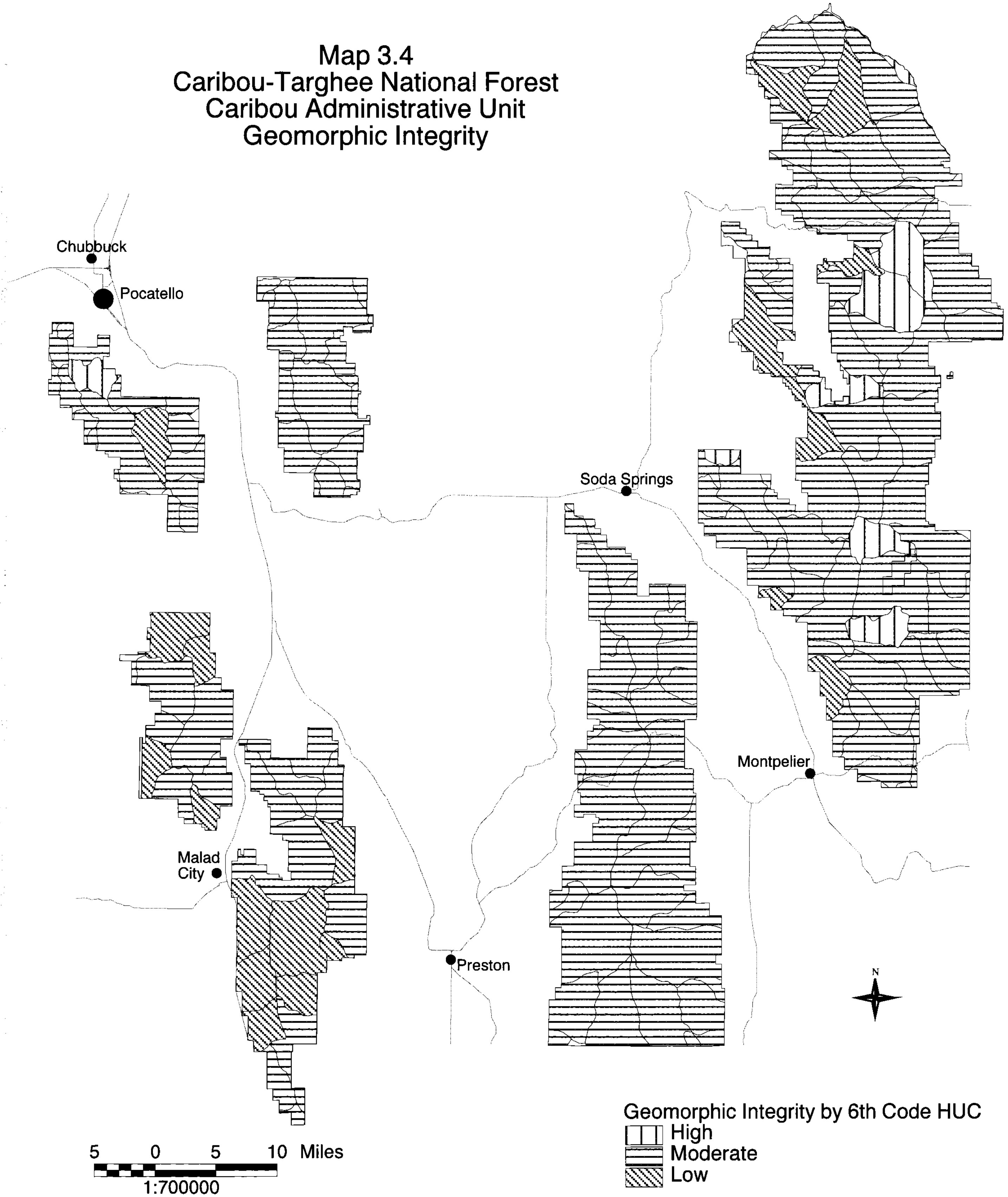
SUMMARY

When combined, the different scales of watershed assessments (EPA/USGS, State of Idaho, IWWI) suggest the watersheds in and adjacent to the Forest have been impacted to one degree or another by human activities, such as agriculture, mining, timber harvesting, livestock grazing, and urban expansion. Larger-scale assessments, conducted by EPA/USGS and the State of Idaho, suggest more serious watershed degradation has occurred on those lands outside the Forest boundary. Agriculture and urban development have been the primary factors. Crop production, where fields are plowed, alters the soil profile, which in turn alters runoff potential and exposes soils to greater potential erosion and stream sedimentation. Pesticides and fertilizers have also been detected in surface and ground water throughout the area. The damming of streams and rivers and diverting streamflows for irrigation have altered stream hydrographs and channel function. Urban development alters runoff and sediment potentials and is a source for a variety of pollutants, including petroleum

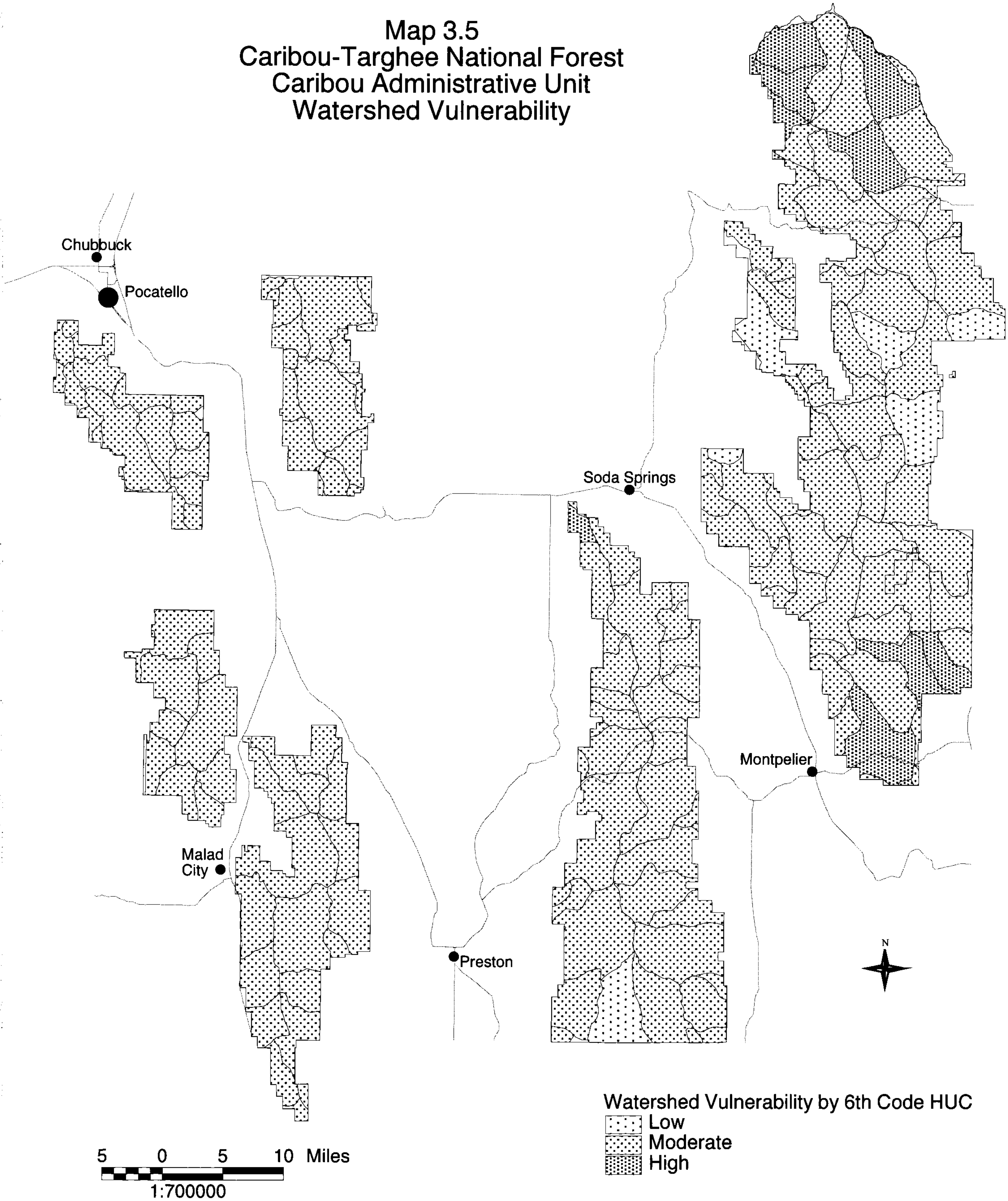
products and a multitude of other chemicals and byproducts. Lands within the Forest have also been impacted, but most watersheds are adequately supporting physical and biological processes and functions. Improvements in overall watershed conditions can be made by reducing impacts or modifying management practices and activities.

Most of the assessments and monitoring conducted by the Caribou/Targhee National Forest have been directed at the riparian and in-channel aquatic habitat conditions, rather than on the watershed scale. This monitoring is discussed in the riparian and aquatic sections.

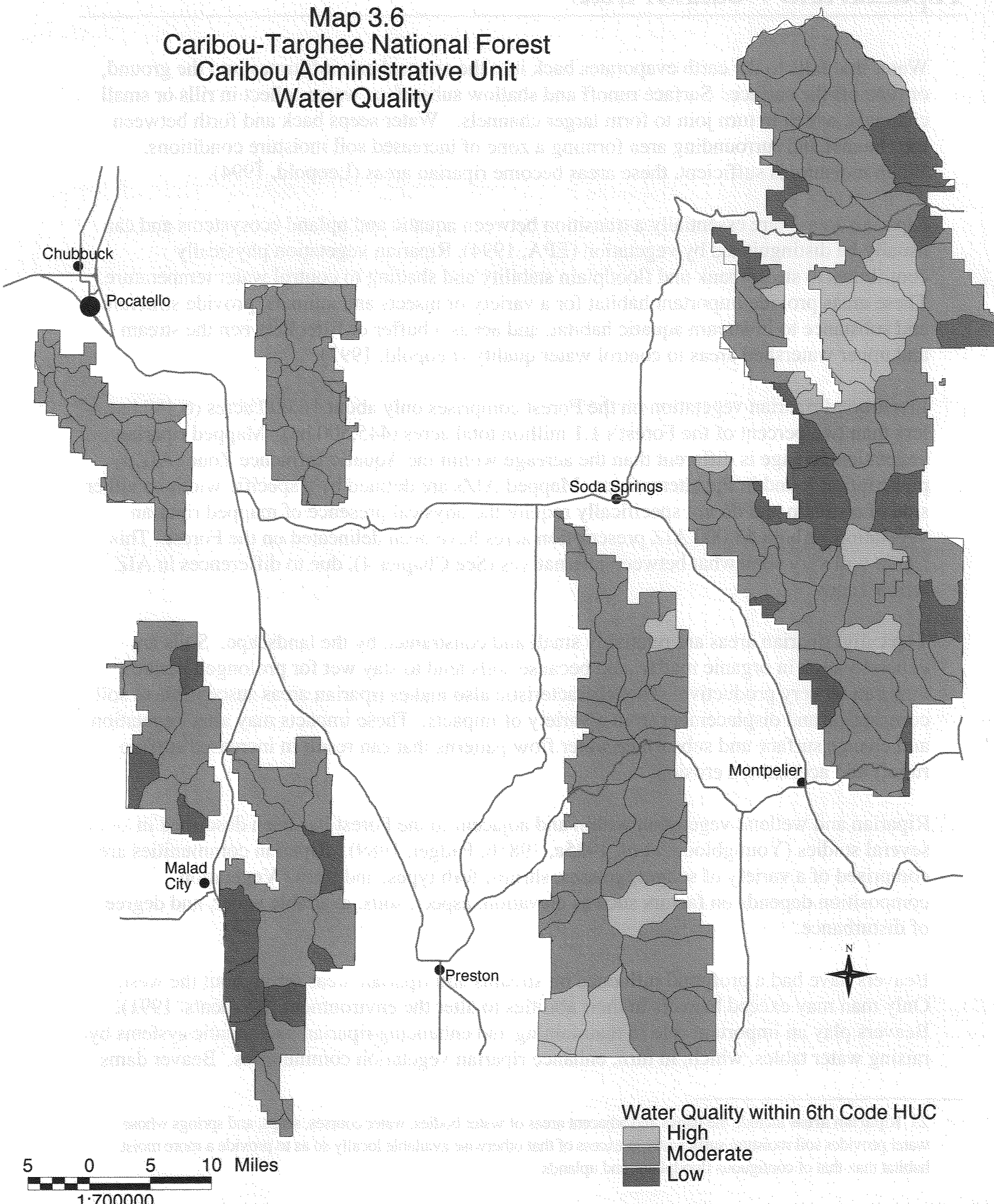
Map 3.4
Caribou-Targhee National Forest
Caribou Administrative Unit
Geomorphic Integrity



Map 3.5
Caribou-Targhee National Forest
Caribou Administrative Unit
Watershed Vulnerability



Map 3.6
Caribou-Targhee National Forest
Caribou Administrative Unit
Water Quality



Riparian and Wetland Areas

Water that falls to the earth evaporates back into the atmosphere, infiltrates into the ground, or runs off the surface. Surface runoff and shallow subsurface water collect in rills or small channels, which in turn join to form larger channels. Water seeps back and forth between the channel and surrounding area forming a zone of increased soil moisture conditions. When moisture is sufficient, these areas become riparian areas (Leopold, 1994).

Riparian areas[25] are essentially a transition between aquatic and upland ecosystems and can usually be distinguished by vegetation (EPA, 1994). Riparian vegetation physically contributes to streambank and floodplain stability and shading to control water temperature. These areas provide important habitat for a variety of insects and animals, provide structure and substance to in-stream aquatic habitat, and act as a buffer or filter between the stream and upper watershed areas to control water quality (Leopold, 1997).

Inventoried riparian vegetation on the Forest comprises only about 16,000 acres (6,480 ha), less than two percent of the Forest's 1.1 million total acres (445,500 ha). Mapped riparian vegetation acreage is different than the acreage within the Aquatic Influence Zone (AIZ) prescription found in the alternatives. Mapped AIZs are defined by a specific width on either side of a stream and do not specifically require the physical presence of mapped riparian vegetation. About 63,000 AIZ prescription acres have been delineated on the Forest. This figure will vary somewhat between alternatives (See Chapter 4), due to differences in AIZ buffer zones.

Typically, riparian areas are relatively small and constrained by the landscape. Soils are generally high in organic matter, and because soils tend to stay wet for prolonged periods, they can be very productive. This characteristic also makes riparian areas susceptible to soil compaction and displacement from a variety of impacts. These impacts may alter vegetation and change surface and subsurface water flow patterns that can result in increased surface runoff and accelerated erosion.

Riparian and wetland vegetation within and adjacent to the Forest has been described in several studies (Youngblood, *et al,* 1985a, 1985b; Padget, 1989). Riparian communities are comprised of a variety of sedges, grasses, shrubs, forb types, and trees. Vegetation composition depends on factors such as elevation, aspect, soils, available water, and degree of disturbance.

Beavers have had a profound influence on streams and riparian areas throughout the west. Only man may exceed beavers in their abilities to alter the environment (Clements, 1991). Beavers play an important role in maintaining and enhancing riparian and aquatic systems by raising water tables, which, in turn, enhance riparian vegetation communities. Beaver dams

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25 **Riparian areas** include the banks and adjacent areas of water bodies, water courses, seeps, and springs whose water provides soil moisture sufficiently in excess of that otherwise available locally so as to provide a more moist habitat than that of contiguous floodplains and uplands.

trap sediment and reduce water velocities, thereby reducing streambank and streambed erosion potential; and serve to improve overall water quality and water storage. Additionally, beaver activity helps stabilize stream flows; enhances fish habitat; improves habitat for waterfowl, game and non-game birds and animals; and increases forage and water for grazing animals (Olsen, *et al*, 1994). Beaver activity and its influence on riparian areas and stream channels have been important in many drainages on the Forest, both historically and currently. Some areas, however, have been degraded where beaver dams have breached from floods or loss of dam maintenance. When these events occur, these unstable sites can contribute to water quality degradation and reduce channel stability.

Riparian soils, inventoried and mapped on the Forest, were formed from two major distinct geologic parent materials. Riparian areas found on the stable parent materials, such as those on the Bear River Range, are more resilient and less likely to erode. Those found on unstable parent materials, such as those on the Preuss Range, experience periodic mass failure, are more likely to erode, and are less resilient. (USDA-FS, 1990)

During the late 1800s and early 1900s, valley erosion occurred throughout much of the western states. It was thought to be caused by two factors: a small but significant change in rainfall intensity and amount, and significant disturbance of watersheds and stream channels by European man from timber harvest, livestock grazing, and agricultural activities (Leopold, 1994). The effect of these activities not only changed the character of many stream channels present on the landscape, but also served to modify adjacent water tables, water quality, aquatic and riparian habitat, riparian vegetation and overall watershed stability.

The current condition of riparian areas within and adjacent to the Forest has been assessed at two different scales, the subregional scale and the stream level scale, using two different protocols described below.

RIPARIAN VEGETATION PROPERLY FUNCTIONING CONDITION

Analysis Scale: Subregion

At the subregion scale, overall condition of all riparian vegetation within the assessment area was evaluated, regardless of land ownership, including private land adjacent to the Forest, as well as state land and lands administered by other federal agencies. Overall findings of this large-scale assessment indicate riparian areas have generally undergone extensive departure from historical conditions of structure, composition, disturbance regimes, and patterns. The greatest departure has occurred on low-gradient, valley-bottom channels, particularly those found in unstable parent materials. Developments, such as roads, conversion of land to agricultural production, and domestic livestock grazing, have contributed to the departure.

This condition assessment indicates soil compaction and displacement have altered the hydrologic function in many riparian areas. The extent of these kinds of conditions is usually limited in size within small portions of riparian areas, but monitoring shows some riparian systems on the Forest have detrimentally disturbed soils. Management activities, such as livestock grazing, mining, logging, recreation, and road construction have had an impact on the condition of the Forest's riparian soils. More recently, increasing use by off-highway vehicles (OHVs) has resulted in localized impacts on watersheds on the Forest. Riparian

areas, because they are recreation focal points, have taken a disproportionate share of impacts (Leffert, 2002, personal observations). Impacts, particularly from recreation and OHV use, are expected to increase unless regulated.

Disruption of the historic fire regime in surrounding upland vegetation types has generally influenced watershed vegetation structure and composition throughout the region. Increases in upland vegetation types and densities that use, transpire, and evaporate more water have become established in some areas, which can reduce the amount of water available for streamflow. As a result some riparian areas have become smaller in size, vegetation composition has changed, and/or the condition of associated aquatic ecosystems has been modified. Other factors that have influenced riparian size, structure, and quality include channel downcutting and diversions by agricultural, hydropower, and municipal interests. (USDA-FS, 1995, 1997)

Caribou National Forest Riparian Area Properly Functioning Condition Assessment

Analysis Scale: Stream Level

The functioning condition of riparian areas refers to how well the physical processes in riparian areas are working; it represents the resiliency that allows riparian areas to hold together during high flow events with a high degree of reliability. This resiliency allows an area to produce desired values, such as fish habitat, over time. Riparian condition assessments are based on quantitative science. A stream/riparian area in properly functioning condition (Prichard, 1998) is able to:

- Dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood-water retention and ground water recharge; and
- Develop root masses that stabilize streambanks against cutting action, in accordance with the capability and potential of the area.

Even though a stream's type or development stage may be at PFC, other factors could be included to describe a desired future condition. These factors could include aquatic habitat needs, bank stability, vegetation, wildlife and/or water quality requirements.

A team of Forest specialists assessed the Riparian Properly Functioning Condition on all streams on the Forest at the stream level. Using riparian PFC protocols, channel hydrologic processes and channel stability are assessed at the stream level scale, in addition to vegetation and biological components. A stream system generally cannot be properly functioning without a strong, healthy riparian component.

Forest specialists, including a hydrologist, fish biologists, range conservationists and foresters, evaluated over 300 streams within the Forest. Each stream was assessed as a whole, with the understanding that individual streams could have segments in varying conditions. If varying conditions were minor, then it weighed less in the overall rating than if the conditions were more extensive. As time, money, and available personnel allow, the

evaluation will be ground-truthed by stream segments. Rating values were subdivided into five categories:

"Properly functioning" means the hydrological, vegetation and soil erosion/deposition components of the stream system are in working order and functioning properly

- "**Functioning at risk**" means the stream system components are functioning properly, but an existing condition makes the system susceptible to degradation. Forest specialists to further define the condition of the system have added the categories of High, Moderate, or Low.

- "**High**" means the stream is currently functioning properly, but a minor problem within the watershed could contribute to the degradation of the stream channel - it is at the "high" end of the functioning-at-risk scale.

- "**Moderate**" means mid-scale.

- "**Low**" means the system is currently functioning properly, but factors are present within the watershed that could easily cause the system to become "nonfunctional" - it is at the "low" end of the functioning-at-risk scale.

- "**Non Functioning**" means that vegetation, landform, or energy dissipaters, such as large woody debris, are clearly not adequate to provide for system protection or function (Prichard, 1998).

Fisheries habitat can generally be correlated to riparian system function. A stream in "properly functioning" condition generally has channel and riparian characteristics that are needed to provide adequate habitat for healthy aquatic populations. Conversely, "nonfunctioning" systems usually lack one or more channel or riparian characteristics that may be needed for adequate aquatic habitat. Certain anomalies that are not part of this PFC assessment could degrade aquatic habitat such as temperature, water quality contamination, and/or intergravel sediment content. These factors are not evaluated in the Riparian PFC process. If present, these factors could limit or degrade habitat, even though the stream may be rated as properly functioning. For this reason, PFC is not necessarily considered to be an ultimate desired condition but is used as an indicator of overall condition.

Table 3. 47. Summary Findings of the Riparian Properly Functioning Condition Assessment for the Caribou National Forest.

Stream Classification	Number of Streams/Segments	Percent of Total Streams Assessed	Number of Miles	Percent of Total Miles Assessed
Properly Functioning	94	30%	255	24%
Functioning at Risk – High	81	26%	332	30%
Functioning at Risk – Moderate	74	24%	307	29%
Functioning at Risk – Low	34	11%	103	10%
Non Functioning	29	9%	73	7%
Total	312	100%	1,070	100%

The majority of the streams on the Forest, approximately fifty-six percent (or about fifty-eight percent of total stream miles assessed), fall into the upper two categories (Properly Functioning Condition and Functioning At Risk – High). About eighty percent (or nearly ninety percent of total stream miles assessed) are in moderate or better condition and fall into the upper three categories (PFC, FAR-H and FAR-Moderate). The remaining nine percent of the streams, or about seven percent of the total stream miles within the Forest, are considered Non functioning.

ISCC Riparian PFC Assessment

Analysis Scale: Stream Reach

In addition to the general stream-by-stream assessment conducted by the Forest, a joint effort of personnel from both state and federal agencies intensively assessed several streams within the upper Blackfoot River drainage on a more comprehensive reach-by-reach basis. The Idaho Soil Conservation Commission (ISCC) led this effort between 1995 and 1998. As would be expected, ratings ranged from Properly Functioning Condition (PFC) to Non-Functioning (NF). The following table summarizes those observations. Observations include both private and public lands, where applicable.

Table 3. 48. Idaho Soil Conservation Commission PFC Assessment.

Stream Name	Properly Functioning Condition (Miles)	Functioning at Risk (Miles)	Non Functioning (Miles)
Slug Creek	1.4	0	0
Dry Valley Creek	0.5	5.0	2.0
Maybe Canyon Creek	1.2	0	0
Angus Creek	0.4	0	0
Lanes Creek	1.9	1.5	3.0
Browns Canyon	0	0.5	0
Corrailsen Creek	0	0	1.3
Lander Creek	0	0.3	0
Diamond Creek	9.6	2.0	1.0

The Forest assessment on the stream-scale rated Slug Creek as Functioning at Risk (FAR)-High, slightly below the reach-specific ISCC evaluation, which rated the stream at Properly Functioning Condition (PFC). Dry Valley Creek was rated in the Forest assessment as Functioning at Risk-Moderate, which correlates with the predominant rating of the ISCC evaluation.

Maybe Canyon Creek was rated as Non functioning (NF) in the Forest assessment, but at PFC in the ISCC evaluation. Upstream phosphate mining impacts Upper Maybe Canyon Creek. The ISCC evaluation focused on the relatively less impacted portion downstream from the mine. While the Forest assessment rated the overall stream condition as Non functioning, the lower reach evaluated by ISCC to be Properly Functioning was rated as Functioning at Risk in the Forest assessment because of these upstream impacts.

Angus Creek was rated as Functioning at Risk in the Forest assessment with a short stream segment rated at PFC in the ISCC evaluation.

Lanes Creek within the Forest boundary was rated in the Forest assessment as Functioning at Risk-Moderate. Most of the ISCC evaluation occurred on private land below the Forest boundary. The ISCC evaluation rated about 25 percent of the stream in this area as Properly Functioning, about 25 percent as Functioning at Risk, and about 50 percent Non functioning. Most of the Non functioning reaches were on private land below the Forest boundary.

Browns Canyon stream was rated as Functioning at Risk-high in the Forest assessment and Functioning at Risk in the ISCC evaluation.

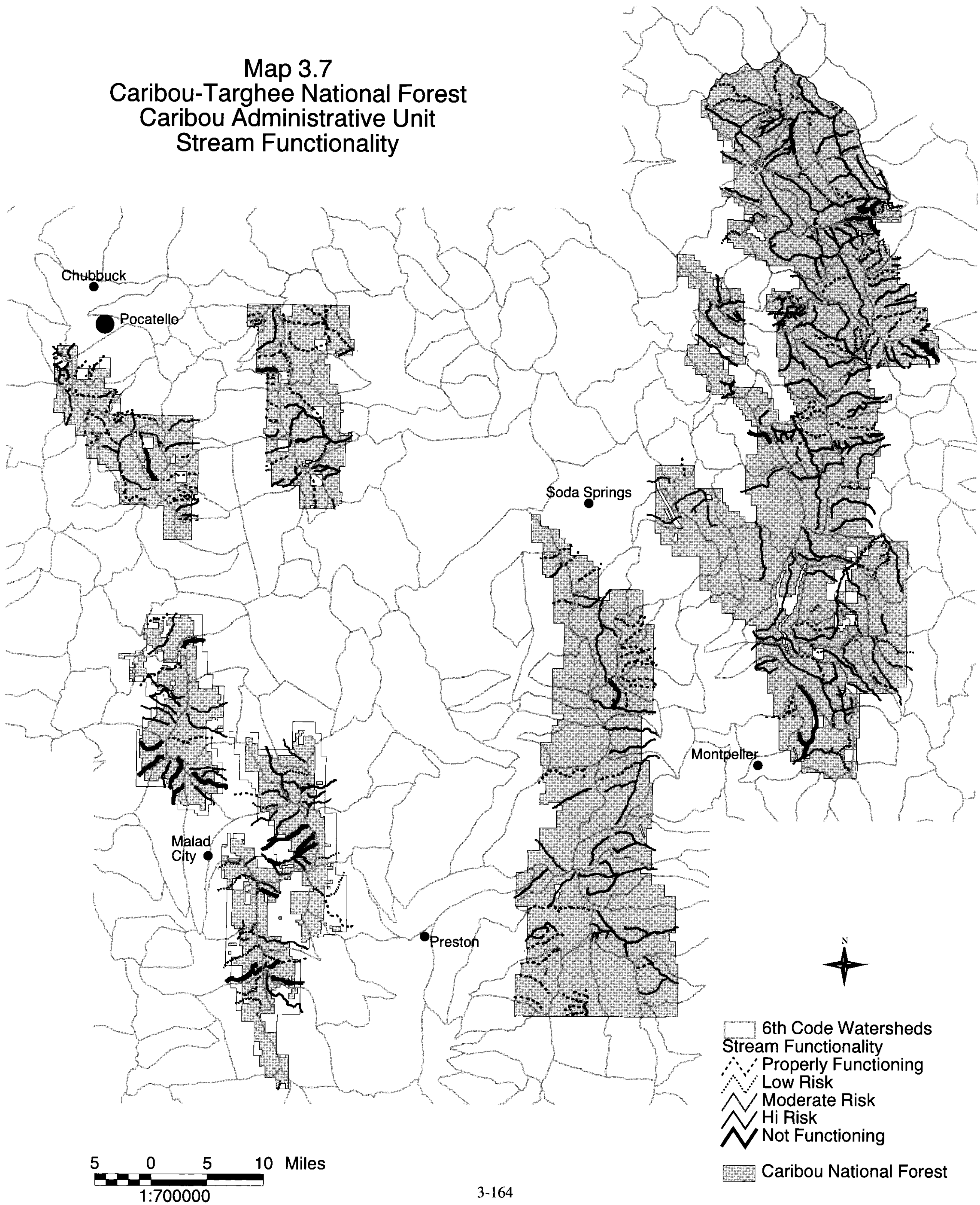
Corrailsen Creek was rated Functioning at Risk-High and Non functioning in the ISCC evaluation. The ISCC evaluation occurred in the lower reaches of the stream on private land below the Forest boundary, where livestock grazing have impacted the stream.

The Forest assessment rated Lander Creek in Properly Functioning Condition, while the ISCC evaluation rated the stream as Functioning at Risk.

Diamond Creek was rated Functioning at Risk-Moderate in the Forest assessment and generally at PFC in the ISCC evaluation. The ISCC evaluation rated about 15 percent of the stream as Functioning at Risk, and about 8 percent was rated as Non functioning.

The Forest assessment and ISCC reach-specific ratings are very close. About 47 percent of the streams surveyed by ISCC are at PFC, about 29 percent are Functioning at Risk, and about 23 percent rated as Nonfunctioning. It should be noted that the majority of stream reaches rated as Nonfunctioning in the ISCC evaluation were located on privately owned lands downstream of the Forest. When excluding privately owned lands and considering the small sampling of streams within the Forest in the ISCC evaluation, the overall Forest and ISCC percentages of Properly functioning, Functioning at Risk, and Non functioning are very similar.

Map 3.7
Caribou-Targhee National Forest
Caribou Administrative Unit
Stream Functionality



WETLANDS

Analysis Scale:

Wetlands differ slightly from riparian areas in that wetlands usually are characterized as having more available water for longer periods of time. Wetlands have been defined in Section 404 of the Clean Water Act, in the Food Security Act of 1985, and other regulations and publications. Accepted definitions include three basic elements - hydrology, vegetation, and soils. The U.S. Fish and Wildlife Service defines wetlands as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water." Using the U.S. Fish & Wildlife Service classification, wetlands must have one or more of the following three attributes:

1. Wetlands must support predominantly, at least periodically, hydrophytes.[26]

2. Wetland substrates[27] are predominantly undrained hydric soils.[28]

3. The substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

Most of the nation's wetlands are privately owned. Nearly seventy-four percent are under private ownership, twenty-five percent are managed by federal or state agencies, and two percent are under the jurisdiction of local governments. Within the federal category, forty percent are managed by the U.S. Fish and Wildlife service, twenty-three percent by the U.S. Forest Service, and thirty-seven percent by other federal agencies (USFWS, 2000).

The U.S. Fish and Wildlife Service has mapped wetlands throughout the United States, including within and adjacent to the Forest (Maps are on file in the Supervisor's Office and are located on the internet at http://wetlands.fws.gov.) Hundreds of wetlands have been identified across the Forest, ranging in size from several hundred acres (Elk Valley Marsh) to only a few square feet. Most of the major streams on the Forest have associated wetlands.

More than fifty percent of the original wetlands in the lower forty-eight states have been lost since the United States was settled (USFWS, 2000). Contributing factors include farming, roading, and urban sprawl. Congress recognized the importance of wetlands and in 1972 established a permit program to be administered by the Army Corps of Engineers to regulate discharges of dredged or fill material into navigable waters of the United States. This authorization came under Section 404 of the Federal Water Pollution Control Act Amendments of 1972. In 1975, following a court ruling, the Corps was directed to extend its responsibility to regulate "all" waters of the United States with no size or quantity restrictions. In 1977, the Corps' Section 404 responsibility was further refined. In 1977 President Carter signed Executive Order 11990, which states, in part, "Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of

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26 **Hydrophytes** are perennial vascular aquatic plants having over wintering buds under water. Hydrophytes are plants growing in soil too waterlogged for most plants to survive.

27 A **substrate** is the base on which an organism lives.

28 **Hydric soils** are soils that are saturated, flooded, or ponded long enough during the growing season to develop anacrobic conditions in the upper part.

wetlands." This soon became a "no net loss" policy that is practiced today by the federal agencies.

Under E.O. 11990 and subsequent Section 404 regulations, wetlands can be impacted, but mitigation measures must be used to minimize these impacts. If mitigation is not sufficient, the area of wetland affected must be replaced or offset by restoring, improving or creating like wetlands.

No specific assessments have been completed for the condition of the Forest's wetlands, although they have been included in other watershed and riparian condition inventories. By regulation, wetlands within the Forest boundary will continue to be protected to insure both quality and quantity remain at or better than current conditions.

The current quantity and quality wetlands is considerably below potential throughout the southeastern Idaho. Wetlands have probably been impacted the least within the Forest boundary, though mining, timbering, road building, and grazing have disturbed or eliminated some wetlands. Wetlands, as riparian areas, can also be focal points of recreation. Off-highway vehicle use is increasing forest-wide. Because wetlands and riparian areas tend to attract recreationists, these areas generally see disproportionate amounts of OHV and other recreational impacts. These impacts are expected to increase as human populations and vehicle numbers increase. Proactive measures have been enacted recently by the Forest to protect wetlands. One example is the nomination of Elk Valley Marsh as a Wild and Scenic waterbody.

WATER QUALITY

Analysis Scale: Waterbody

The quality of the water found throughout the Forest has been monitored for many years by a variety of individuals and agencies. Numerous methods and indicators have been used, ranging from the use of macroinvertebrates[29] as indicators of water quality, to collection of actual chemical and physical water quality parameters. DEQ, Forest Service personnel, and others have conducted macroinvertebrate surveys throughout the Forest since the late 1970s. Over forty streams have been sampled. In general, the quality of water indicted by the insects has been fair to good. Warning signs are evident for those taxa tolerant to sediment and organic enrichment in many of the streams, but clean water species are also present, which indicate better water quality conditions (USDA-FS, 1983, 1984, 1985, 1991, 1992, 1993, 1994, 1995, 1996). Chemical and bacteriological data also were collected over the same time period. Most parameters have been within established State water quality standards, with only a few scattered violations. These data have been entered into the national STORET water quality database. Raw data printouts are stored in the Supervisor's Office in Idaho Falls and on the Soda Springs Ranger District.

The quality of water flowing in area streams and in the subsurface aquifers has been impacted by a variety of means throughout southeastern Idaho. Agricultural and industrial interests have probably had the greatest impact on water quality throughout the region.

[29] **Macroinvertebrates** are insects that live in streams for all or part of their life cycle

Farming bares the soils to increased water and wind erosion potential. Added fertilizers and pesticides can run off fields into surface water or seep into the subsurface aquifers. Mining, aside from physically altering watersheds and increasing sediments, has caused increases in heavy metals in some locations, which have been found both in surface waters and subsurface aquifers. Other industrial activities contribute hydrocarbons and other pollutants to both surface and subsurface waters. DEQ has identified more than seventy stream segments within southeastern Idaho that do not support designated beneficial uses. The result is a measurable degradation of water quality from potential quality throughout the area. In general, waters within the Forest have been impacted the least, with the majority of streams inside the Forest boundary supporting designated beneficial uses.

Over the past few years, turbidity data have been collected in nearly thirty streams throughout the Forest by both Forest and volunteer personnel. No violations of state criteria have been noted. Likewise, temperature assessments have recently been conducted in several streams on the Forest. Some violations of maximum temperature criteria have been noted in several streams. In general, these violations have occurred during the summertime heat of the day, with temperatures cooling within established criteria during the night.

Phosphate mining companies and their contractors have collected the most site-intensive data. Phosphate mining permits require water quality monitoring as part of the operating permit; however, data collection points are concentrated in and adjacent to mining sites and do not assess streams that are not associated with mining activities. Data are summarized in annual water quality monitoring reports, associated Environmental Impact Statements, mine operating plans, and other reports. (Copies are available at the Supervisor's Office and Soda Springs District Office.) Over fifty streams or stream reaches have been examined. These include: Blackfoot River, Dry Valley, No Name, Spring, Mill, Angus, Smokey, Sage, Lanes, Sheep, Maybe, Slug, and Timber Creeks. Parameters include over forty physical and chemical features, such as temperature, suspended sediments, anions and cations, nutrients, and heavy metals (USDA, 2002; USDI, 2002; Rhone-Poulenc, 1996; Mariah Associates, 1992, 1993 and 1995; Conda Partnership, 1992).

Heavy metals, including selenium, have been detected in several waterbodies within and adjacent to the Forest in quantities that exceed state and federal standards for drinking water and other beneficial uses. The source of these contaminants has been associated with area phosphate mines. To gain a better understanding of the implications and impacts of selenium and other heavy metals, Idaho Department of Environmental Quality (DEQ) and the Forest Service established a Selenium Task Group. Members of the Task Group include representatives from private industry, research, and state and federal agencies. One charge of the Task Group is to develop Best Management Practices (BMPs) that can be applied to the contaminant source areas to stop or reduce the amount of contaminants being delivered to surface and ground water. The BLM, Forest Service, and DEQ are responsible for ensuring that developed Best Management Practices are followed to mitigate or reduce local and downstream impacts from both active and inactive mine sites. Investigations by the Task Group are ongoing. To date, a series of Best Management Practice (BMP) guidance manuals have been compiled and published by the Idaho Mining Association Selenium Committee (DEQ, 2001). As research continues, changes in BMPs and/or standards will probably occur.

Approximately fifty streams have been investigated: Blackfoot River, Diamond Creek, Angus Creek, Rasmussen Creek, Slug Creek, Smokey Creek, Sage Creek, Wooley Valley Creek, Georgetown Creek, No Name Creek, and Lanes Creek. Parameters include such factors as physical features, anions and cations, nutrients and heavy metals, such as Selenium (Montgomery Watson, 1999).

The State of Idaho has conducted an extensive analysis of surface water quality throughout the State of Idaho in association with Section 303(d) of the Clean Water Act. This section of the Act requires all states to assess surface water within their borders to determine if designated beneficial uses of the waterbodies are being met. If it is determined that the quality of the waters is not sufficient to support designated beneficial uses, then the states are required to develop Total Maximum Daily Loads (TMDLs) for the pollutant impairing beneficial uses to improve and protect the quality of the waterbody. The State of Idaho has completed water quality assessments for the Portneuf and Blackfoot River watersheds. A draft waterbody assessment for the Bear River drainage is due for release to the public in late 2002. The State of Idaho has concluded the majority of the streams within the Forest are meeting minimum requirements to support designated beneficial uses; however, several streams within and adjacent to the Forest have been determined as not supporting beneficial uses (IDEQ 2000). These are listed in the following table:

Table 3. 49. Water Quality Limited (303d) Streams Inside and Outside of Forest Boundary.

Stream Name	Location	Pollutant	Stream Miles
INSIDE FOREST			
Dry Creek	Headwaters to Thomas Fork	Nutrients, sediment	8.7
Snowslide Canyon	Headwaters to Montpelier Creek	Sediment	2.0
Meadow Creek	Headwaters to North Creek	Metals, sediment	3.1
Weston Creek	Headwaters to Bear River	Nutrients, sediment	19.6
Williams Creek	RF Williams Creek to Bear River	Nutrients, sediment	5.0
Fivemile Creek	Headwaters to Bear River	Unknown	11.0
Wrights Creek	Headwaters to Daniels Reservoir	Sediment	11.1
Deep Creek	Headwaters to Mouth	Unknown	14.0
Blackfoot River	Several segments	Sediment, flow alteration, nutrients, organics	2.5
Slug Creek	Headwaters to Blackfoot River	Sediment	23.6
Angus Creek	Headwaters to Blackfoot River	Sediment	8.0
Dry Valley Creek	Headwaters to Blackfoot River	Sediment	11.1
Diamond Creek	Headwaters to Blackfoot River	Sediment	20.0
Lanes Creek	Headwaters to Blackfoot River	Sediment	10.4
Sheep Creek	Headwaters to Lanes Creek	Sediment	7.9
Maybe Creek	Maybe Canyon waste dump to Dry Valley Creek	Unknown	2.9
Hawkins Creek	Headwaters to Marsh Creek	Nutrients, sediment	15.1
North Creek	Unnamed tributary to 3.2 km below Mill Hollow to Ovid Creek	Unknown	8.1
Boulder Creek	Headwaters to Stump Creek	Unknown	6.5
Bridge Creek	Source to Grays Lake	Unknown	Unknown
Harrison Creek	Source to Grays Lake	Unknown	Unknown
Eagle Creek	Source to Grays Lake	Unknown	Unknown
Willow Creek	Source to Grays Lake	Unknown	Unknown
OUTSIDE FOREST			
Bear River	Various reaches	Flow alternation, nutrients, sediment	100+
Preuss Creek	Forest boundary to Thomas Fork	Habitat alteration, sediment	3.7
Pearl Creek	NF Pearl Creek to Bear River	Nutrients, sediment	2.2
Coop Creek	Forest Boundary to Stauffer Creek	Nutrients, sediment	3.4
Ovid Creek	Confluence of North and Mill Creeks to Bear River	Sediment	14.5
St. Charles Creek	Lower State lands boundary to Refuge	Nutrients, sediment	6.6
Cub River	Sugar Creek to Utah State line	Nutrients, sediment	9.1
Whiskey Creek	Headwaters to Bear River	Nutrients, sediment	3.2
Deep Creek	Oxford Slough to Bear River	Unknown	10.2
Elkhorn Creek	Forest boundary to Little Malad River	Unknown	14.0
Portneuf River	Various reaches	Bacteria, Nutrients, Sediment, Oil & Gas, Flow alternation	75+
Cherry Creek	Forest boundary to Birch Creek	Nutrients, sediment	7.4

Stream Name	Location	Pollutant	Stream Miles
Malad River	Headwaters to Pleasant View	Sediment	30.6
Blackfoot River	Various reaches	Sediment, flow alterations, nutrients, organics	80+
Bacon Creek	Forest boundary to Lanes Creek	Sediment	3.0
Dairy Creek	Headwaters to Wrights Creek	Unknown	12.0
Worm Creek	Glendale Reservoir to Utah State line	Unknown, temperature	12.9
Strawberry Creek	Forest boundary to Mink Creek	Unknown	5.3
Devil Creek	Devil Creek Reservoir to Marsh Creek	Nutrients, sediment	18.5
Marsh Creek	Calvin Road to Portneuf River	Nutrients, sediment	48.4
Birch Creek	Birch Creek Road to Marsh Creek	Nutrients, sediment	6.5
Indian Creek	Forest boundary to Portneuf River	Unknown	3.5
Little Malad River	Headwaters to Malad River	Sediment	24.2
Maple Creek	Left Fork Cub River	Bacteria, unknown	8.1
Garden Creek	Garden Creek to Marsh Creek	Nutrients, sediment	7.5
Grays Lake	Grays Lake Tributaries	Sediment	115 acres
Grays Lake Outlet	Brockman Creek to Homer Creek	Sediment	34.8

WATER YIELDS AND USES

Analysis Scale:

Water is arguably the most important single natural resource in the western United States. Although the United States has an abundant water supply, shortages occur because supply is distributed differently than demand. Water, its quality and quantity, continue to be a major natural resource issue in the West.

SURFACE WATER

The Forest contains about 1,264 miles of perennial[30] streams inside the Forest boundary. Two lakes are found within the Forest, Bloomington and Swan Lake, and two reservoirs, Montpelier Creek Reservoir and Stone Reservoir. Stone Reservoir is located on Curlew National Grassland. These waterbodies have a combined surface area of about 437 acres (UDSA-FS, 1985). The volume of water shed from each of the major watersheds across the forest was estimated during the previous planning process. Table 3.50 displays these yields.

[30] **Perennial** streams are those that flow at least ninety percent of the year (Hewlett, *et al*, 1969).

Table 3. 50. Inherent Water Yields (USDA-FS, 1985) Scale: 5th HUC.

PWI* Watershed Number	Watershed Name	Acreage	Inherent Yield (Acre ft./Acre per year)	Inherent Yield (Feet per year)
001	Geneva	22,876	13,726	0.06
002	Montpelier	31,544	15,141	0.48
003	Georgetown	53,278	41,024	0.77
004	Weston	31,207	7,802	0.25
005	Malad	72,698	15,994	0.22
006	Crow	59,995	36,015	0.60
007/008	Stump & Tincup	120,079	70,748	0.59
009	Jacknife	29,743	19,630	0.66
010	McCoy	57,054	50,778	0.89
011/012	Bear Lake and Bear Lake Outlet	138,777	140,938	1.02
013/015	Grace & Cub River	97,738	44,637	0.46
014	Grays Lake	17,624	15,862	0.90
016	Blackfoot	129,182	78,801	0.61
017	Upper Portneuf East	47,565	26,636	0.56
018	Upper Portneuf West	24,596	13,774	0.56
019	Marsh Creek	49,243	17,727	0.36
020/021	Portneuf & Rattlesnake	45,312	11,337	0.25
022-025	Curlew Area	47,592	1,903	0.04
026	Logan River	27,212	35,905	1.32
Average Yield				**0.56**
Total Yield			**658,378**	

* Project Work Inventory Watershed – roughly a 5th HUC scale.

In many cases, demand for water leaving the Forest exceeds the available supply. This situation is expected to continue into the foreseeable future. The largest, single use of this water is for irrigation. Water is also used for domestic, recreational, hydropower and municipal purposes. The ongoing adjudication process in the Snake River Basin illustrates the significance of water, in terms of quality and quantity. Within the Portneuf, Blackfoot, and Salt River watersheds, more than 7,500 claims have been submitted to the State of Idaho for a variety of water uses. Claims have come from both the public and private sectors. Additionally, the national Clean Water Act mandates specific processes and procedures to protect and/or improve the nation's waters.

For example, the Idaho Department of Environmental Quality (DEQ) is required by section 303(d) of the Clean Water Act to identify waterbodies within the State of Idaho where beneficial uses are impaired and to establish Total Maximum Daily Loads (TMDLs) for all pollutants identified as degrading those beneficial uses. Diverting water from streams for irrigation, hydropower and other uses can have a profound effect on the quantity and quality of the remaining water and can be a factor as to whether a stream is capable of supporting assigned beneficial uses. On one hand, the State is trying to provide for its citizens by allowing water diversions to meet a variety of needs. On the other hand, the State is required to maintain water quality. Often, conflict arises between the need to provide water for consumption and the need to provide clean water for other uses.

In 1993, the Forest Service valued an acre-foot of water (325,900 gallons or 1,233,662 liters) at about $36.00 (USDA-FS, 1990).[31] The City of Pocatello charges $1.24/1, 000 gallons (3,785 liters) of treated domestic water. This market value equates to about $400.00 per acre-foot. Through an analysis conducted in the Curlew National Grassland area, irrigation water was determined to cost from $150 to $500 per share. Shares vary in quantity, depending on the irrigation company or district, but are normally measured as water one inch deep, covering one acre (also termed acre-inch, or 1/12 acre foot). This equates to about $1,800 to nearly $6,000 per acre-foot (USDA-FS, 2000).

Few changes in the use of water have occurred over the last decade. Various state, tribal and federal agencies regulated use in response to a variety of competing needs. Striking a balance among these various uses is important in maintaining the resource for future generations. Sometimes various water uses are complementary. Rivers, for example, can be used simultaneously to provide recreation, fish habitat, and to meet wildlife needs. Other uses, such as irrigation and power generation, are also important but may preclude or limit other uses such as recreation or fish habitat. As the population of the area continues to grow, conflicts are expected to increase; people will need to reach consensus to address and provide for the various needs of all users.

Forest Service Manual (FSM) 2540 describes processes and procedures to obtain water rights for National Forest System (NFS) lands. Three methods of acquisition can be used:

1. Federal law claiming existing and foreseeable uses under the "reservation doctrine" is one method of acquisition. This avenue is limited to those uses specifically needed to manage NFS lands in accordance with the legal authority for the purposes identified for those lands. These rights are limited in scope to specific uses, such as domestic water needed for Ranger Stations and administrative sites, fire protection and control, water needed for tree nurseries, etc.

2. State law and regulations provide a second avenue. Under State law the Forest must, as any citizen, apply for a water right or make a claim in a State court adjudication. The Forest has filed more than 1,500 claims, primarily for stock water and campground use, in the Snake River Adjudication process. These claims are public record and are maintained in the State's water rights database, which is available on request from the State. The Forest continues to apply for new water rights through State processes and procedures; just as any other individual would apply. Instream flow needs for recreation, wildlife, and other uses and resources can also be obtained under State law; however, to date, no instream flows have been granted by any state, including Idaho, in a contested proceeding (Witte, 2002). Through permits issued by the Federal Energy Regulatory Commission (FERC) the Forest has negotiated channel and fish habitat maintenance bypass flows associated with two small hydropower plants on Mink and Summit Creeks. These flows are associated with springtime snowmelt runoff and adjusted on an annual basis, based on snowpack.

31 This is an average value of all uses, including irrigation, recreation, and domestic uses.

3. Purchasing an existing water right is the third way to appropriate water. Generally, this approach is expensive and seldom used.

GROUNDWATER

Groundwater resources have not been thoroughly investigated in southeast Idaho. Studies have been confined to specific sites or types of aquifers. Several investigations in the Bear River area have been completed by the Idaho Department of Water Resources (IDWR, 1976; Wilson (1985; Idaho Department of Reclamation (IDR), 1969; Idaho Water Resource Board (IWRB), 1970). Numerous investigations have been completed is association with phosphate mining in the area. These include publications by: Ralston, (1980); Sylvester, (1975); Winter, (1980); Robinette, (1977); and Environmental Impact Statements for each of the operating phosphate mines, including Dry Valley and Smokey Canyon.

In the Bear River basin, groundwater is contained in alluvium and basalt, the Salt Lake and Wasatch formations and undifferentiated bedrock. Although less permeable, older rocks occupy most of the surface area in the basin, the younger, more permeable basalt and alluvium probably are capable of supplying most of the water. Most of the wells within the bottomlands of Thomas Fork, Bear Lake, Gentile and Cache valleys are 200 to 300 feet deep within Quaternary age alluvium consisting of gravel, sand, silt and clay. The Salt Lake Formation, which crops out along the margins of the major valleys, consists of limestones, sandstones, rhyolite tuff and unconsolidated conglomerate. Water wells in this formation have yielded up to 1,800 gallons of water per minute.

The Wasatch Formation is restricted largely to the Bear Lake Plateau in the extreme southeastern corner of Idaho. It is composed of conglomerate and sandstone with small amounts of shale, limestone and tuff. Water wells within this formation have been largely unsuccessful and of poor quality. The undifferentiated bedrock makes up the major mountain masses in the basin and is composed of more than two-dozen formations. The bedrock consists of mostly carbonate rocks, quartzite, shale and sandstone. Some of the limestones have been dissolved by water to produce solution cavities. These cavities give rise to innumerable springs that provide water to individuals and municipalities for domestic, agriculture and other uses. The quality of the water is mostly good to excellent (IDR, 1969).

The geology of the Portneuf and Blackfoot River basins consists of sedimentary rock containing limestone and sandstone. The Phosphora Formation, which contains phosphate ore, lies within these basins. Hydrogeologic studies of transmissivity[32] and conductivity[33] have been completed for major formations. Transmissivity ranges from less than twenty square feet per day in the Mead Peak formation to more than 12,000 square feet per day in the Rex Chert Member of the Phosphoria Formation. Ground water recharge is from surface sources seeping into the interfaces of the various formations. Water is of varying quality that reflects parent material (Ralston, 1979). More recently, contaminants, particularly heavy

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[32] **Transmissivity** is water in storage that is released from an aquifer, measured in unit volume per unit time (i.e., gallons per minute).

[33] **Conductivity** is the movement of water though an aquifer, measured in linear distance per unit of time (i.e., feet per day).

metals such as selenium, have been found in varying quantities in groundwater within and adjacent to phosphate mines. Tests are ongoing to determine the degree and extent of contamination from these mine sources.

HYDROPOWER

The USDA Forest Service has authority under the Federal Power Act of 1920 to provide the Federal Energy Regulatory Commission (FERC) with terms, conditions, and recommendation regarding the licensing or re-licensing of hydroelectric facilities that affect National Forest resources and interests. Approximately eighteen FERC hydroelectric facilities operate in the same counties as those associated with the Caribou-Targhee National Forest. About ten of these facilities operate on the Caribou portion of the Forest. Four of these projects are exempt from FERC licensing and are authorized under a Special Use Permit. Two new projects are proposed, but these projects have not been licensed or constructed. At the present time, licenses are being pursued for five FERC hydropower projects, including the two new projects mentioned above.

Three hydroelectric projects exist wholly or partially on NFS land on the Caribou portion: Mink Creek (Franklin County), Paris Creek (Bear Lake County), and Mill Creek (Bannock/Oneida Counties). Mink Creek is scheduled for relicensing in 2036. Paris Creek and Mill Creek are exempt from FERC licensing, but the Forest provides a Special Use Permit for operations on Forest Service land. Eight other hydropower projects occur in waters downstream of the Forest's boundary and have the potential to affect forest resources, particularly migratory fish.

The use of surface and ground water throughout southeastern Idaho has not changed substantially over the past few decades. It is estimated that costs of water provided to municipalities and agricultural interests will increase over time as demands increase and the cost of removing contaminants escalates. Increasing pressure from single-use interests may polarize water users and create greater conflicts in determining how and where water should be allocated. Although Federal laws and regulations allow National Forests to acquire limited water rights through Federal processes, including instream flows, the types of water uses allowed through federal appropriation are extremely limited. As a result, the majority of water used by the Forest is appropriated through State law. This approach to water acquisition will continue into the foreseeable future. Water is perhaps the West's most precious natural resource. Special interest groups, political councils and advisory groups, state and federal regulators, and managers must work together if the needs of all users are to be addressed.

Aquatic Biota

Analysis Scale: Forest-wide

Issue Statement:

Forest Plan Alternatives and management direction may affect the condition, function, and processes of watersheds, riparian, stream channels, aquatic habitat, fish populations, and water quality.

Issue Indicator:

♦**R.4** **Fish population viability based on probability of persistence over the long-term**[34]

Baseline Indicator: **Low**

BACKGROUND TO ISSUE

The diversity of aquatic life on the Forest is high, considering the Caribou portion of the Caribou-Targhee National Forest spans two river basins – the Snake River and Bear River. The high diversity of habitat available on the Forest is described in the preceding section of this issue. Aquatic biota includes plants and animals that depend upon the aquatic environment for at least a part of their life history. Because the Forest contains a rich diversity of aquatic biota, it is not possible to discuss each component in this analysis. General discussions of the status and distribution of aquatic biota are available in Volume III of "An Assessment of Ecosystem Components in the Interior Columbia Basin (USDA-FS and USDI-BLM, 1997).

Native fish communities are an integral element in the composition, structure, and function of aquatic ecosystems. Fish typically dominate the aquatic vertebrates. They are sensitive to disturbance and potentially integrate the effects of landscape and watershed processes over large spatial and temporal scales. Fish have influenced the development, status, and success of human social and economic systems. They can also be important pathways for nutrient and energy flows between aquatic and terrestrial systems. Even in waters historically barren of fish, introduced fish profoundly influence the structure of aquatic communities (USDA-FS, and USDI-BLM, 1997). This analysis will concentrate upon select native fish species. It is believed that if native fish habitat is protected and restored, other important aquatic biota that have adapted to similar habitat conditions will also benefit and be perpetuated.

Concern is increasing for the well being of native fish species, especially native salmonids, throughout the western United States. Recent assessments have indicated a dramatic decline in the status of many freshwater fish species. Significant declines in the abundance of trout and salmon have been attributed to several factors, including the introduction of exotic species, habitat degradation, loss of connectivity from dams and diversions, and over harvest (USDA-FS, 1996).

[34] **Long-term** is considered to be 15 to 100 years.

Concern for the status of western cutthroat trout prompted the Forest Service to initiate Habitat Conservation Assessments for many interior cutthroat trout subspecies. In 1992, the Chief asked the Forest Service Regions to develop interregional habitat conservation assessments (HCAs). The purpose of these assessments was to update and synthesize existing management and research information and develop a common base of technical knowledge for decision makers. The HCAs provided baseline data from which to make future resource decisions on National Forest System (NFS) lands. In 1994 the Chief reaffirmed the need for HCAs emphasis in species protection and management (USDA-FS, 1996).

Generally, within the Upper Columbia River Basin, stronger native fish populations, including cutthroat trout on the Caribou portion of the Forest, are associated with higher-elevation forested lands and densities generally decline as road densities increase. The largest areas of contiguous watersheds supporting strong populations of key salmonids are found in the central Idaho Mountains, the Snake River headwaters, and the Northern Cascades areas. Strongholds on National Forest lands generally have remained stable or slightly increased. Analysis of extensive stream inventory data reveals that major decreases in pool habitat, particularly depth and frequency, have occurred Basin-wide over the last forty to sixty years. These decreases are attributed to losses in riparian vegetation, road and highway construction, timber harvest, grazing, farming, and other disturbances. The losses appear to be greatest in low-gradient, biologically productive areas, which are primarily found in lower watersheds on privately owned lands. Instream wood and fine sediment also were influenced by management activities (USDA-FS, 1996a).

The composition, distribution, and status of fish within the Basin are different than they were historically. Overall changes are extensive, and in some cases, irreversible. Even with no further habitat loss, the fragmentation and isolation of many populations place salmonid species at risk. Extensive stocking of non-native fish species has also had a profound effect on the density and genetic purity of native cutthroat trout (USDA-FS, 1996a).

In addition to Bonneville and Yellowstone cutthroat trout, several other native fish species occur on the Forest. The Intermountain Region of the Forest Service and the State of Idaho provided special designations for some of these species. The native species that occur on and adjacent to the Forest and their associated status are listed below:

NATIVE FISH

Table 3. 51 Native Fish Found on the Caribou

Common Name	Scientific Name	Status
Yellowstone cutthroat trout	Oncorhynchus clarki bouvieri	S, SC-A
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	S, SC-A
Mountain whitefish	*Prosopium williamsoni*	
Bonneville cisco	*Prosopium gemmifer*	SC-A
Bear Lake whitefish	*Prosopium abyssicola*	SC-A

Common Name	Scientific Name	Status
Bonneville whitefish	*Prosopium spilonotus*	SC-A
Leatherside chub	*Gila copei*	SC-C
Utah chub	Gila atraria	
Mottled sculpin	*Cottus bairdi*	
Piute sculpin	*Cottus beldingi*	
Bear Lake sculpin	*Cottus extensus*	SC-A
Longnose dace	*Rhinichthys cataractae*	
Speckled dace	*Rhinichthys osculus*	
Redside shiner	*Richardsonius balteatus*	
Utah sucker	*Catostomus ardens*	
Bluehead sucker	*Catostomus discobolus*	
Mountain sucker	*Catostomus platyrhynchus*	

S: USDA Forest Service Regional Forester Sensitive Species designation (Forest Service Manual 2670.5). Those plant and animal species identified 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; or,
Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

SC: Idaho Fish & Game Species of Special Concern: Native species that are either low in number, limited in distribution, or have suffered significant population reductions due to habitat losses, but are not likely to become Threatened in the near future. The three categories are:

SC-A: Species which meet one or more of the criteria listed above and for which Idaho presently contains, or formerly constituted, a significant portion of their range (i.e. priority species);

SC-C: Species that may be rare in the state but for which there is little information on their population status, distribution, and/or habitat requirements (i.e. undetermined status species).

Of the native fish listed above, Bonneville cutthroat trout, Yellowstone cutthroat trout, and leatherside chub are featured in the affected environment, effects analysis, and population viability assessment of this document and in Appendix B. They were selected because of their special status designations and because Forest management activities have the potential to affect (both positively and negatively) their populations and habitat.

BONNEVILLE CUTTHROAT TROUT (*ONCORHYNCHUS CLARKI UTAH*)

The Bonneville cutthroat trout (BCT) is the only trout native to the Great Basin. The species thrived in ancient Lake Bonneville and its tributaries. About 8,000 years ago, the lake desiccated and populations[35] fragmented, forcing the trout into streams throughout the basin, forming isolated, disjunct populations. As a result, two populations with genetic differences are evident today between the Bear River Basin Bonneville cutthroat trout and those found in the main Bonneville Basin in southern Utah. The BCT evolved in a lake environment. Following the draining of Lake Bonneville, only Bear Lake (located adjacent to the Forest), Utah Lake (located near Provo, Utah) and Panguitch Lake (Utah) retained lake populations. Of these populations, only Bear Lake populations still survive. During the past 150 years, metapopulations[36] have been significantly reduced by human activities, including non-native trout introductions and habitat fragmentation (USDA-FS, 1996a; Kershner, 1995).

[35] **Populations** of fish consist of a group of fish that spawn and rear in a specific tributary, but not in the main stem of the river. They are effectively isolated from fish in other tributaries (Rieman, *et al*, 1993).

[36] **Metapopulations** are a collection of fish populations that interact through the exchange of individuals (Rieman, *et al*, 1993).

The historic habitat for the Bear River Bonneville cutthroat trout (BRB), found within the upper Bear River Subbasin (4th HUC) in Idaho, is estimated to include about 2,000 stream miles. About twenty-nine percent of this historical mileage occurs within the boundaries of the Bridger-Teton, Caribou, and Wasatch-Cache National Forests. It is estimated that populations exist only in about seven percent of the historical mileage and about twenty-five percent of historic habitat within the National Forest (USDA-FS, 1996a). Since 1996, several additional populations have been identified on National Forest land, and these figures should be revised upward in the future.

Within the central Bear River Subbasin (4th HUC), about seventy-seven percent of Forest Service administered habitat is currently occupied.[37] Occupied habitats occur within the Smith's and Thomas Fork of the Bear River in Wyoming and Idaho. Range-wide population status, however, has been evaluated as "at risk – stable," but many populations within the Caribou National Forest were classified to be "at risk – declining" or "unknown" (USDA-FS, 1996). Habitat on private land is generally fair to poor with a decreasing trend (USDA-FS, 1996a).

Within the lower Bear River Subbasin, from Soda Springs, Idaho to the Great Salt Lake, approximately 1,323 miles of historic streams are thought to have been occupied. Approximately twenty-seven percent of those miles are located on National Forest System lands. Current population occupancy is only about one percent of the potential historical habitat. Of those populations located within the boundaries of the Forest, about seventy-eight percent occupy what is considered "fair" habitat, and twenty-two percent occupy what is considered "poor" habitat. Habitat trend indicates that forty-four percent are "stable," with the rest "unknown" (USDA-FS, 1996).

The Forest Service has identified the Bonneville cutthroat trout as a Sensitive Species. They have been classified as a "species of special concern" by Idaho Department of Fish & Game. U.S. Fish and Wildlife Service was petitioned to list Bonneville cutthroat trout under the Endangered Species Act (ESA). U.S. Fish and Wildlife Service determined the Bonneville cutthroat trout is not warranted for listing at this time.

Aquatic habitat on the Forest is extremely important to the overall survival of Bonneville cutthroat trout in Idaho. Most stream populations of Bonneville cutthroat trout in Idaho occur on Caribou-Targhee National Forest lands.

In 1994 the Caribou National Forest signed a Conservation Agreement to aggressively manage lands within the Montpelier-Elk Valley Cattle and Horse Allotment, which includes lands within both the Thomas Fork drainage (Preuss, Dry, and Giraffe Creeks) and the Salt River drainage (Crow Creek and tributaries). Participating parties are: Idaho Department of Fish and Game, Idaho Soil Conservation Commission, Caribou Cattlemen's Association, Bear Lake Soil and Water Conservation District, Idaho Department of Environmental Quality, Natural Resources Conservation Service, and the U.S. Forest Service. The Agreement was last reviewed and amended in March 2000. This Agreement revised livestock grazing practices throughout the allotment and specified actions needed to improve

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[37] Additional populations have since been identified.

stream and riparian habitat conditions. A comprehensive monitoring protocol was also established. Monitoring has revealed an improvement in overall habitat conditions, and increases in fish populations have been documented.

In addition, a range-wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout was signed in December 2000 by: Idaho Department of Fish & Game, Nevada Division of Wildlife, Utah Department of Natural Resources, Wyoming Game and Fish Department, Confederated Tribes of the Goshute Reservation, USDI-Bureau of Land Management, USDI-National Park Service, USDA-Forest Service, and Utah Reclamation Mitigation and Conservation Commission. The Agreement outlines general conservations actions and activities to be completed within ten years, with the most significant actions to benefit BCT to be implemented within five years.

Intensive surveys for Bonneville cutthroat trout distribution have been conducted on the Forest since 1998. The subspecies are distributed throughout the southern part of the Forest, but populations in various streams or stream segments vary in strength. Populations are affected by competition and interbreeding with non-native, introduced fish species, and habitat alterations. Some populations have been completely replaced by non-native, introduced fish species.

A Bonneville cutthroat trout distribution map was updated in November 2001 for the Caribou portion of the Caribou-Targhee National Forest. Of the thirty-five 6th code HUCs expected to support Bonneville cutthroat trout populations, two HUCs had populations that were considered strong,[38] fifteen had populations that were considered depressed, and fourteen included watersheds where populations were expected but were absent. Additional information regarding Bonneville cutthroat trout can be found in Appendix D of the FEIS.

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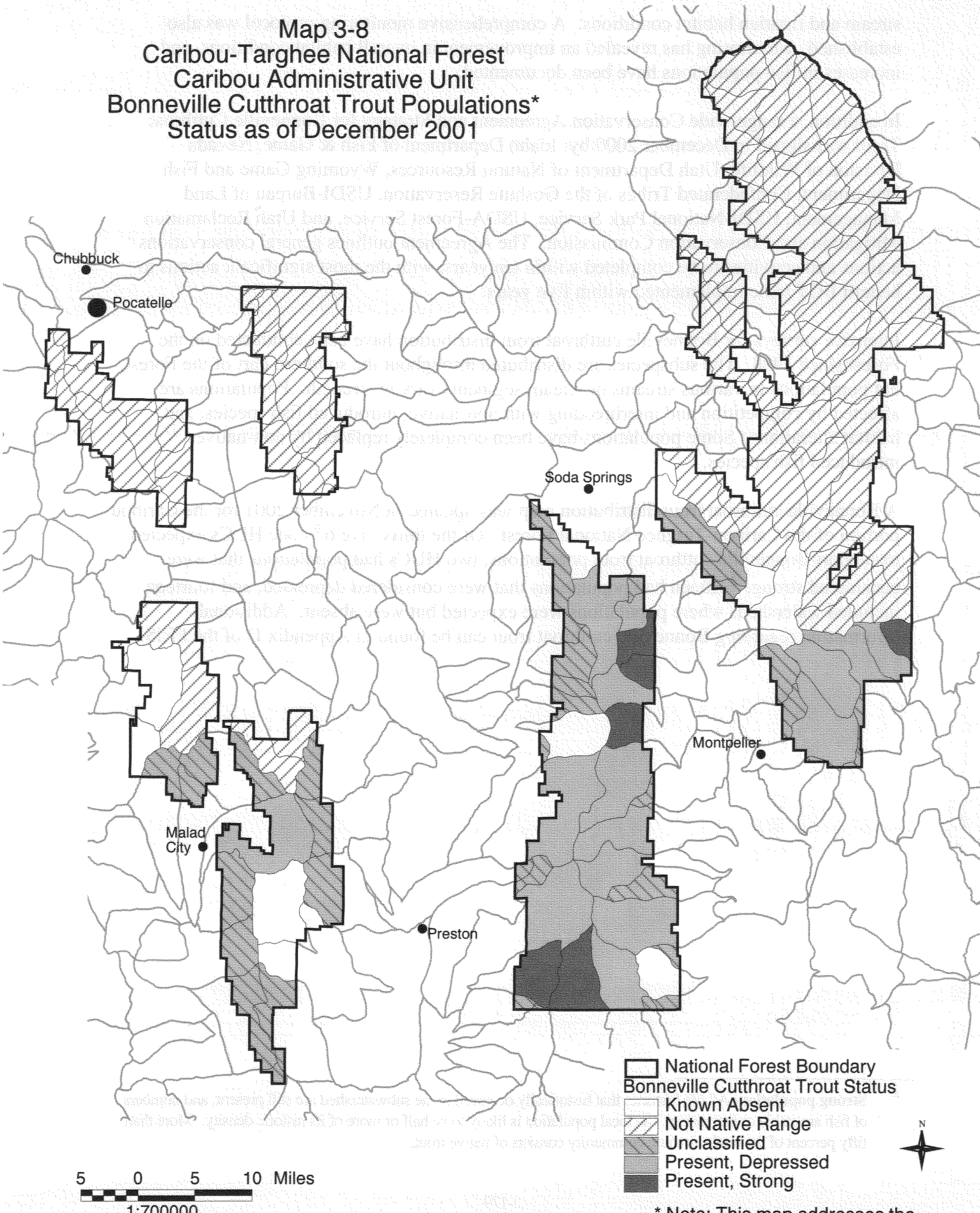
[38] **Strong population**- All life histories that historically occurred in the subwatershed are still present, and numbers of fish are stable or increasing. The local population is likely to be half or more of its historic density. More than fifty percent of the total salmonid community consists of native trout.

Map 3-8
Caribou-Targhee National Forest
Caribou Administrative Unit
Bonneville Cutthroat Trout Populations*
Status as of December 2001



* Note: This map addresses the status of Bonneville Cutthroat Trout only on the Caribou National Forest.

YELLOWSTONE CUTTHROAT TROUT (*ONCORHYNCHUS CLARKI BOUVIERI*)

Yellowstone cutthroat trout (YCT) became isolated in the headwaters of the Snake River following the creation of Shoshone Falls somewhere between 30,000 and 60,000 years ago. Historic habitat essentially covered the entire Snake River drainage above Shoshone Falls, which includes the Blackfoot, Salt, and Portneuf River drainages. Two Yellowstone cutthroat trout spotting pattern varieties have been documented, a large- and fine-spotted form. Continued genetic comparison of the two spotting pattern forms has not provided definitive proof that would lead to a total acceptance that the "fine-spotted" cutthroat trout is indeed a separate subspecies (USDA-FS, 1996a; Behnke, 1992). For the purposes of this environmental impact statement, both spotting variations will be considered as one.

Historic YCT river and stream habitat within Idaho is estimated to be nearly 4,000 miles. In addition, three lakes, Henry's and two Palisades Lakes, were thought to be occupied. Current assessments indicate less than 2,000 miles are currently occupied, or about forty-three percent, including streams flowing through private, state, and federal lands. Within Forest Service lands, this trout occupies about fifty-three percent of its historical habitat. At present, it is estimated that eighty to ninety percent of occupied YCT habitat occurs within the National Forest System (May, 2000). Of the nineteen subbasins that contain aquatic habitat on Forest Service lands, approximately forty-seven percent were identified as having "good" habitat, thirty-seven percent with "fair" habitat, and sixteen percent containing "poor habitat".

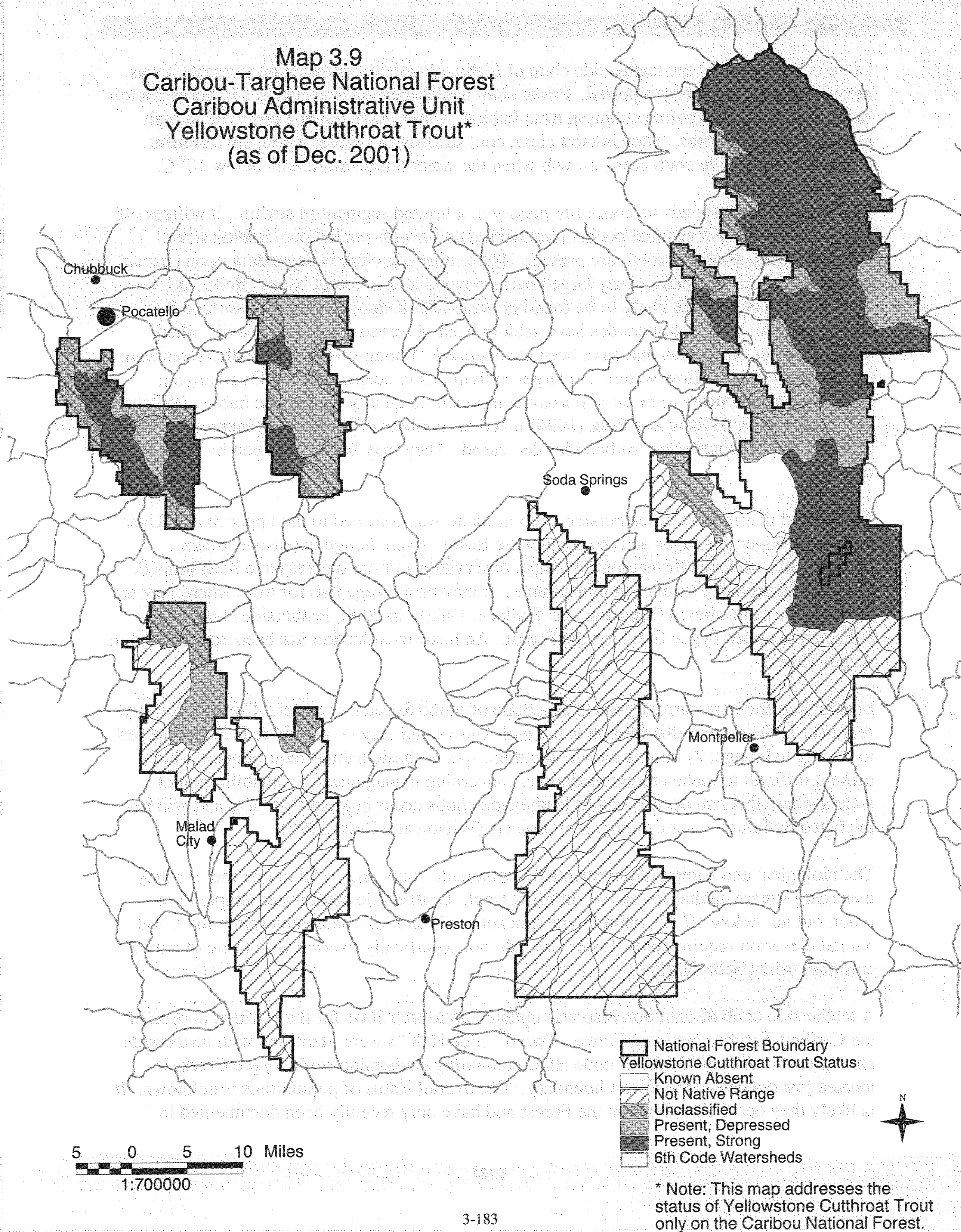
Within the Forest twenty percent of habitat was rated as "good," forty percent as "fair," twenty percent as "poor," and twenty percent was considered to be "unknown" (USDA-FS, 1996). The apparent decline of the species is attributed to a variety of factors, including angler harvest and hybridization with introduced species, such as rainbow trout and non-native cutthroat trout, which are thought to be the primary causes of decline. Human activities, such as dam construction and water diversions, have disconnected populations. Other activities, such as grazing, mineral extraction, road construction, and timber harvest have substantially degraded environments (Gresswell, 1995). The species has been designated a "Species of Special Concern – Class A by the American Fisheries Society and was petitioned for listing under the Endangered Species Act (ESA). The ninety-day finding for the petition to list the YCT as Threatened, determined " that the petition failed to present substantial information indicating that listing this subspecies of fish may be warranted at this time." (Federal Resister/ Vol. 66, No. 37, Friday, Feb 23,2001, p. 1124-11249). The Forest Service designated the species as "Sensitive," and Idaho Fish and Game identified it as a "species of special concern."

In March 2000, five states, Yellowstone National Park, and the Forest Service entered into a Memorandum of Agreement (MOA) intended to provide a range-wide focus on shared goals and objectives for the conservation and restoration of YCT. The stated goal of the MOA is to "ensure the persistence of the Yellowstone cutthroat subspecies within its historic range and to manage YCT to preserve genetic integrity and provide adequate numbers and populations to provide for the protection and maintenance of both the intrinsic and recreational values associated with this fish." (May, 2000).

A Yellowstone cutthroat trout distribution map was updated in December 2001 for the Forest. Of the fifty-one 6th code HUCs with Yellowstone cutthroat trout data on the Forest, thirty-four HUCs had populations that were considered strong, fourteen had populations that were considered depressed, and three had populations where populations would be expected but were absent.

It appears that Yellowstone cutthroat trout are well distributed throughout the Caribou portion of the Forest within the Snake River Basin. Perhaps one of the most significant threats to the species within the Forest is the introduction of non-native fish. As an example, rainbow trout were stocked in Blackfoot Reservoir. Historically, rainbow trout with the ability to reproduce were stocked there. Today, the majority of the stocked rainbow trout are sterile. The presence of naturally reproducing rainbow trout in the headwaters of the Blackfoot River, including Diamond Creek, is on the increase (Scully, 2001). Rainbow trout interbreed with native cutthroat trout affecting their genetic purity. They also compete for habitat with native fish.

Composite ecological ratings for the six 4th Hydrological Unit Code (HUC) subbasins in the Caribou portion of the Forest within the range of Yellowstone cutthroat trout estimated that four were "low," one was "moderate," and one was "high" in overall ecological condition. The Interior Columbia River Basin Report (USDA-FS and USDI-BLM, 2000) and Forest fish distribution survey reports for 2000-2001 documented impacts to Yellowstone cutthroat trout habitat that included agriculture, urban expansion, timber harvest, livestock grazing, road building/maintenance/use, dispersed camping, off-road motor vehicle use, and mining. In some areas these activities have affected aquatic and riparian habitat through dewatering, sedimentation, nutrification, stream bank erosion, channel widening/shallowing, isolating populations, and direct trampling of fish. In addition, these activities have decreased riparian vegetation, thereby decreasing available stream shade and nutrients, stream bank stability, and sources for large instream wood in some areas. These impacts affect species habitat requirements, which result in decreasing population productivity, and potentially, long-term population viability. (For additional information on forest-wide habitat condition, refer to the Inland West Watershed Initiative section of the "Riparian/Wetland Areas and Aquatic Habitat" discussion in the preceding section. Additional information on geomorphic integrity, water quality integrity, and watershed vulnerability can be found in this same section of the FEIS.)


Map 3.9
Caribou-Targhee National Forest
Caribou Administrative Unit
Yellowstone Cutthroat Trout*
(as of Dec. 2001)
Chubbuck
Pocatello
Soda Springs
Montpelier
Malad City
Preston
National Forest Boundary
Yellowstone Cutthroat Trout Status
Known Absent
Not Native Range
Unclassified
Present, Depressed
Present, Strong
6th Code Watersheds
N
5 0 5 10 Miles
1:700000
* Note: This map addresses the status of Yellowstone Cutthroat Trout only on the Caribou National Forest.

LEATHERSIDE CHUB *(GILA COPEI)*

Little is known about the leatherside chub of Idaho. Available information suggests it was never abundant and rarely reported. Prime chub habitat generally occurs at a lower elevation in the watershed than prime cutthroat trout habitat. Chubs have not bee observed in high gradient stream reaches. They inhabit clear, cool streams and prefer a pool environment. However, leatherside chub cease growth when the water temperature falls below 10^0 C.

It is likely the fish spends its entire life history in a limited segment of stream. It utilizes off channel pool or main channel pocket pool habitat and avoids pocket pool habitat when predators, such as brown trout, are present. The leatherside chub is dependent upon channel complexity for cover, particularly large instream wood and undercut banks (Belk, 2001). This chub species is less likely to be found in areas with a high frequency of surface fine sediment deposition. Leathersides have seldom been observed in eroded, heavily silted stream reaches or in areas that have been channelized. Young-of-the-year leathersides were often observed in shallow waters and larger individuals in deeper waters. Overhanging vegetation also appears to be an important component to quality leatherside habitat (Wilson and Belk, 1996). Wilson and Belk (1996) noted as numbers of brown trout increased, the probability of encountering leathersides decreased. They may be preyed upon by brown trout.

The natural distribution of leatherside chub in Idaho was confined to the upper Snake River and Wood River drainages and the Bonneville Basin. Even though extensive stream sampling has occurred throughout its range, observations of the species have been limited. The species probably spawns in midsummer. It may be a forage fish for trout where they are found in the same stream (Simpson and Wallace, 1982). In 2000, leatherside chub were collected in upper Tygee Creek on the Forest. An historic collection has been documented in Angus Creek.

Leatherside chub are currently listed as a State of Idaho Species of Special Concern for three reasons: 1) the current distribution is not well known and may be greatly reduced compared to its original range; 2) little is known about the species basic habitat requirements which make it difficult to make recommendations concerning management or rehabilitation of waters where this fish occurs; and 3) leatherside chubs occur in areas that have and will be impacted by future water development projects (Wilson and Belk, 1996).

The biological and habitat requirements of leatherside chub likely will not be met if solely managing stream habitat for native cutthroat trout. Leatherside chub water temperature (cool, but not below 10^0 C), habitat type (pocket pools and off-channel/margin pools), and habitat elevation requirements (lower sites) do not specifically overlap with those of native cutthroat trout (Belk, 2001).

A leatherside chub distribution map was updated on March 2001 for the Caribou portion of the Caribou-Targhee National Forest. Two 6[th] code HUC's were identified with leatherside chub present. An additional 6[th] code HUC containing leatherside chub, Tygee Creek, is located just outside of the Forest boundary. The overall status of populations is unknown. It is likely they occur elsewhere on the Forest and have only recently been documented in

distribution surveys. The 2000 and 2001 Caribou-Targhee Forest Fish Distribution Survey Crews were instructed to document any leatherside chub collected during surveys. In 2000, leatherside chub were observed in Tygee Creek (Salt River drainage). Historic observations were documented for Tincup Creek (Salt River drainage) and Angus Creek (Blackfoot River drainage). These streams were surveyed in 2000 and 2001, respectively, and no leatherside chubs were observed. Forest-wide species status is unknown. Additional information regarding the leatherside chub can be found in the Appendices section of the FEIS.

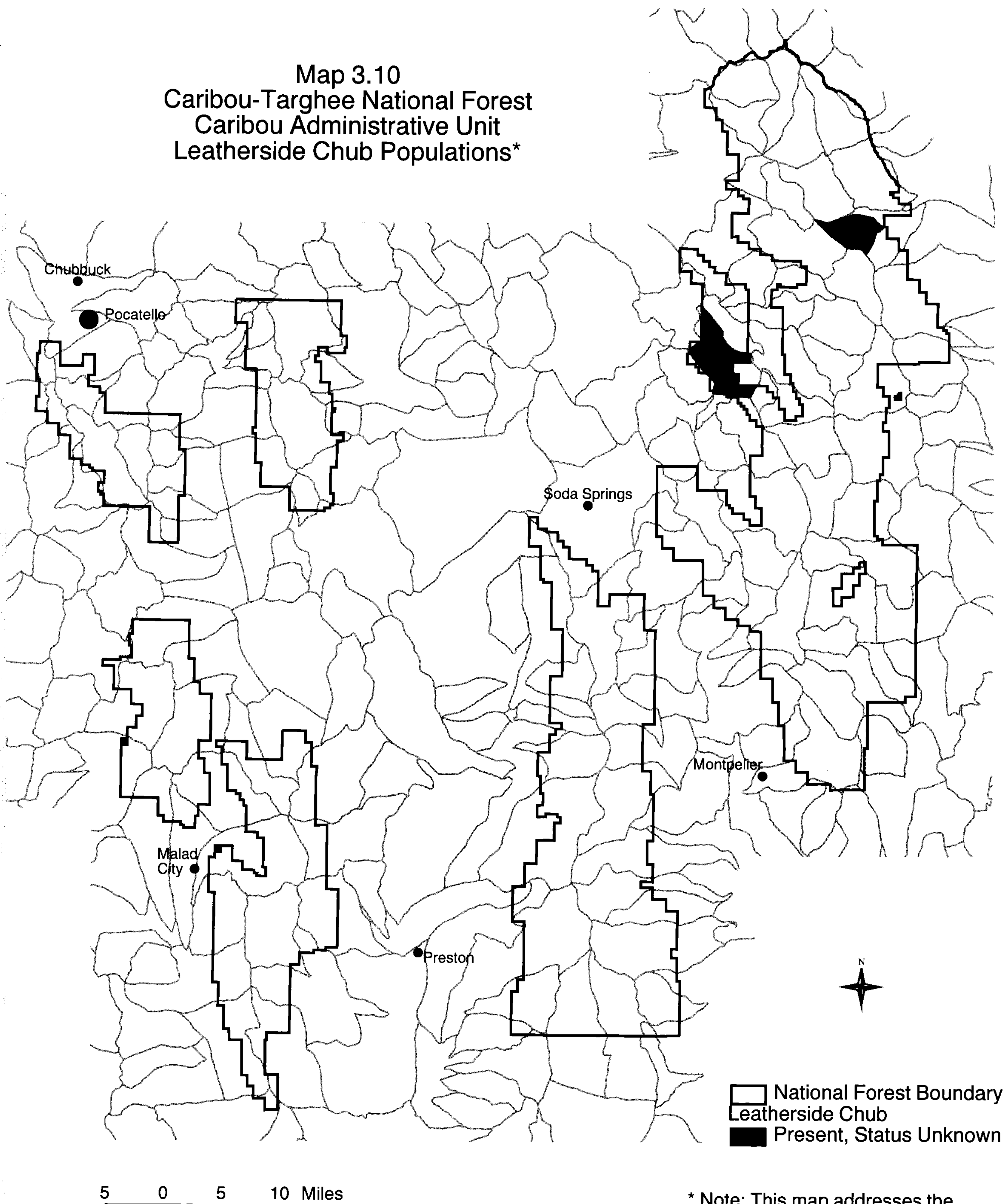
NON-NATIVE FISH SPECIES

Several non-native fish species have been introduced to the Forest and adjacent area over the past 100 years. Most have some value to at some anglers and were originally introduced to meet some perceived need of some resource users. Some stocking of non-native fish by the Idaho Department of Fish & Game continues on the Forest. As more is learned about non-native fish interactions with the natural ecosystem and impact upon some native fish species, some of these introduced fish are gaining reputations as "pest" species. For instance, introduced brook trout have replaced native cutthroat trout in many streams of the Forest. While non-native fish may be desirable in some streams where they are desired by resource users and have an acceptable level of impact upon the aquatic ecosystem, careful consideration of their impacts upon native fish is needed. The introduced non-native fish found on or near the Forest are listed below:

Common Name	Scientific Name
Rainbow trout	***Oncorhynchus mykiss***
Brown trout	***Salmo trutta***
Brook trout	***Salvelinus fontinalis***
Lake trout	***Calvelinus namaycush***
Channel catfish	***Ictalurus punctatus***
Walleye	***Stizostedion vitreum***
Yellow perch	***Perca flavescens***
Carp	***Cyprimus carpio***
Brown bullhead	***Ictalurus nebulosus***
Green sunfish	***Lepomis cyanellus***
Bluegill	***Lepomis macrochirus***
Black crappie	***Pomoxis nigromaculatus***
Largemouth bass	***Micropterus salmoides***
Smallmouth bass	***Micropterus dolomieui***

Additional information regarding non-native fish found on or near the Forest can be found in the Appendix D of the FEIS.

Map 3.10
Caribou-Targhee National Forest
Caribou Administrative Unit
Leatherside Chub Populations*



* Note: This map addresses the status of Leatherside Chub only on the Caribou National Forest.

Existing Fisheries Management Direction and Agreements

Some existing conservation approaches in the protection and restoration of Yellowstone and Bonneville cutthroat trout and leatherside chub can be found in existing agreements and the Inland Native Fish Strategy (INFISH, USDA-FS, 1995). Maintaining consistency with direction such as these and supplementing this direction with site-specific programmatic direction in the Revised Forest Plan will better ensure the protection and restoration of these evaluation species.

Conservation goals and objectives have been developed for Yellowstone cutthroat trout in the Memorandum of Agreement for Conservation and Management of Yellowstone Cutthroat Trout among Montana, Idaho, Wyoming, Nevada, Utah, USFS, Yellowstone National Park, and Grand Teton National Park (Anonymous, 2000). Although these are general and rather broadly worded, they provide some conservation direction.

The Range-Wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout (Lentsch, *et al*, 2000) provides conservation approaches for Bonneville cutthroat trout. These measures are more specific than those in the Yellowstone cutthroat trout Agreement.

INFISH was developed by the Forest Service as interim direction to protect habitat and populations of resident native fish. Its management direction, riparian goals, riparian management objectives, establishment of riparian habitat conservation areas, and standards and guidelines were designed as an interim safety net for imperiled native fish and their habitat on Forest lands. The application of INFISH direction benefits leatherside chub if applied to projects in watersheds where they reside. The Forest Plan revision incorporates relevant portions of INFISH direction.

Issue

7

Timber Sale Program

Analysis Scale:

Issue Statement:

Forest Plan Alternatives and management Alternatives may affect the amount of suited timberlands and sustainable timber managed by the Forest.

Issue Indicators:

♦T.1 **The Allowable Sale Quantity (ASQ):**

Baseline Indicator: 60 mmbf per decade

♦T.2 **The Total Sale Program Quantity (TSPQ):**

Baseline Indicator: 83 mmbf per decade

♦T.3 **Acres harvested**

Baseline Indicator: 16,800 mmbf per decade

♦T.4 **Suited acres**

Baseline Indicator: 125,300 acres

♦T.5 **Acres of suitable timber in roadless areas**

Baseline Indicator:

Suitable Acres: 62,900 acres

♦T.6 **Estimate miles of road construction and reconstruction.**

Miles of road construction: 56 miles construction and 25 miles of reconstruction

BACKGROUND TO ISSUE

Authority for managing National Forest timber derives from laws enacted by Congress, which authorize the Secretary of Agriculture to administer the National Forests. The Multiple-Use, Sustained Yield Act of 1960 recognizes timber as one of five major resources for which the National Forests are to be managed. It further directs the Secretary to develop and administer the renewable surface resources of the National Forests for multiple use and sustained yield of the many products and services obtained from these resources. Specific objectives for managing the forest resource of National Forest System lands include providing a continuous supply of National Forest System timber for the use and necessities of the citizens of the United States and provide an even flow of such timber to facilitate the stabilization of communities and opportunities for employment (FSM 2402). Forest Service policy requires each National Forest to determine the magnitude of the forest management program through the land and resource planning process.

Development of direction for timberland suitability incorporating ecological disturbance patterns and processes, salvage, fuelwood, and aspen management direction, and uniform

definitions and management strategies for old growth were identified as Need for Change topics in the ***Initial Analysis of the Management Situation*** (1999). Concerns related to timber management were also raised over costs and values of implementation, supply and demand for timber, and effects on community stability.

Timberlands previously identified as not suited for timber production are required to be reassessed every ten years. Additionally, a complete reassessment of timberland suitability is warranted because of changes in land ownership, allocation of some land to specific uses, and new technology available for assessing land status.

For direct and indirect effects, the affected area for timber is the lands administered by the Caribou National Forest. This area represents the National Forest System lands occupied by forest vegetation where changes may occur as a result of management activities. The affected area for cumulative effects includes the lands administered by the Forest and lands of other ownership, both within and adjacent to the Forest's boundaries. Cumulative effects, including resources on other ownerships, are analyzed to determine what, if any, management activities need to be modified on National Forest System lands to maintain desired resource conditions.

Current Conditions

The United States has about 732 million acres (296.5 million ha) of forested lands. These diverse ecosystems produce an equally diverse array of tangible and intangible products. Commodities, such as wood products, wildlife habitat, water, minerals, energy, recreational opportunities, some forage for livestock, medicinal plants, real estate, and various plant and animal gene pools are important economic goods. They also produce intangible products such as natural beauty and Wilderness that satisfy important societal values that can be as economically important as more tangible commodities. The Federal government administers about twenty-nine percent of the nation's forestlands (USDA-FS, 1990). (For specific information on the various forested cover types on the Forest, see Ecosystem Management, Issue 3 – Forested Vegetation.)

Forested lands in the United States, particularly in the West, have been and continue to be important to the nation. Of the 262 million acres (55.9 million ha) of forest and rangeland in the eight Rocky Mountain States, 138 million acres (106.1 million ha) are forested land, with seventy-five percent of those acres managed by the federal government. Consequently, Westerners have historic and cultural connections to federal forestland. Population shifts to the wide open spaces of the West increase demand on forest lands for a broader mix of uses and reflect a broader range of associated values. Traditional uses of forestland in the Rocky Mountain States are moving away from timber and wood products toward less consumptive uses associated with other resource values. For example, recreation/tourism is a big and growing business in the Rockies. The attraction is an almost endless array of forest

landscapes whose environments include a variety of wildlife, water, and other resources and values. Because 75 percent of the forested lands in the Rocky Mountain States are publicly owned, the use and management of these lands depend on what the people want from them (USDA-FS, 1990).

Historically, portions of the area now bounded by the Caribou National Forest were heavily logged to meet the needs of the local population. It is estimated that from 1870 to 1900, approximately 500 million board feet were removed from 150,000 acres around Bear Lake Valley. Demand was greatest when the railroad was built through the valley (historical Vegetation on National Forest Lands in the Intermountain Region, 1997). Though little evidence exists of this past harvest activity, today these slopes are covered with stands of mature Douglas-fir, lodgepole pine, quaking aspen and maple.

The Forest provides a variety of wood and wood-related products to the public, including sawtimber, house logs, chips, firewood, Christmas trees, posts, and poles. These products supply commodities to the public, provide revenue to the government, and generate income and jobs for local and regional economies.

The Forest sells approximately 4,000 cords (5,120 CCF) of firewood each year through 700-800 individual firewood cutting permits. Nearly ninety-percent of the Forest's firewood comes from dead conifer trees. The remaining ten percent is green aspen or maple. The demand is expected to remain stable through the next decade.

Approximately forty permits are issued annually for the harvest of post and poles, usually for specific-size lodgepole pine trees. Each of these permits averages between fifty to one hundred harvested trees. Because of the small supply of post/pole sized trees on the Forest, harvest opportunities for these products are limited and are not expected to increase over the next decade; however, management objectives could direct an increase in the production of this product beyond this time period.

More than two thousand Christmas tree permits are issued annually on the Forest. Most of these trees are subalpine fir that are found in natural stands of lodgepole pine and naturally regenerated or planted plantations. Demand for this product usually exceeds the permitted supply. The forest does not encourage commercial operations, except as part of an industrial timber harvest, because of the limited number of acres of early successional stands and their value for wildlife cover and future industrial wood products. Intermittent demand for aspen wood, primarily for chips, exists, although the demand has been erratic over the last decade. Occasional permits are issued for the harvest of other miscellaneous wood products, such as bark, live shrubs and trees, cones and boughs. Demand is not expected to change over the next decade for these types of products.

During the planning decade 1986-1995, the Forest's Allowable Sale Quantity (ASQ) for industrial timber was set at 105 million board feet (MMBF) (210,000 ccf). During the same period, the Forest sold 99.2 MMBF (198,400 ccf), or ninety-four percent, of the ASQ.

Approximately 26,000 acres of past harvest units are documented in the Forest's GIS database. This accounts for nearly all commercial timber harvesting on the Forest since the mid 1960s.

Table 3. 52. ASQ Volume in Million Board Feet (MMBF) and Million Cubic Feet (MMCF) for Fiscal Years 1986-2000.*

Year	MMBF Offered	MMCF	MMBF Sold	MMCF	MMBF Harvested	MMCF
1986	20.3	3.6	20.3	3.6	10.6	1.9
1987	7.8	1.4	7.8	1.4	15.8	2.8
1988	12.1	2.1	7.9	1.4	14.0	2.5
1989	16.3	2.9	12.1	2.1	11.0	1.9
1990	9.1	1.6	9.1	1.6	11.0	1.9
1991	11.7	2.1	10.7	1.9	3.0	.5
1992	12.0	2.1	10.9	1.9	8.0	1.4
1993	9.2	1.6	9.2	1.6	6.0	1.1
1994	7.7	1.4	7.7	1.4	4.1	.7
1995	7.9	1.4	3.5	.6	7.0	1.2
1996	13.5	2.4	8.1	1.5	8.8	1.6
1997	10.3	1.8	6.7	1.2	10.5	1.9
1998	5.8	1.0	5.0	.9	10.5	2.0
1999	7.3	1.3	7.3	1.3	5.8	1.1
2000	2.2	.4	2.2	.4	5.8	1.1

* Represents the original 15-year planning period from 1986-2000.

The Forest completed an inventory of the timber resources in 1993; this data is used to characterize the condition of forest vegetation representing current timber conditions on the Forest. Table 3.53 displays summarized data representing current timber conditions on the Forest.

Table 3. 53. Current Timber Conditions.

Conditions	Timberland Acres
Forest Growing Stock[1]	815 MMCF
Annual Net Growth[2]	-2 MMCF
Annual Mortality[3]	22 MMCF
Seedling/Sapling Trees	112,000 acres
Medium-sized Trees	95,000 acres
Large Trees	379,000 acres
Nonstocked[4]	15,000 acres
Current Growth (Cubic feet/acre/year)	
Less than 20	17,200 acres
20-49	243,500 acres
50-84	257,800 acres
85-119	48,700 acres
120-164	2,900 acres
165-224	0 acres
225+	0 acres

1 **Forest Growing Stock** – net volume in cubic feet of growing stock trees 5.0 inches in diameter at breast height (dbh) and larger, from a one-foot stump to a minimum top diameter of 4.0 inches of the central stem. The annual gross growth is the annual increase in volume for the Forest's growing stock in the absence of cutting or mortality.

2 **Annual Net Growth** – the annual increase (or decrease) in volume for the Forest's growing stock. This includes the increment growth of trees at the beginning of the time period that survive to the period end, the volume of trees growing into the growing stock size class, minus the volume of trees that died or were reclassified because of cull. As indicated in the table, mortality exceeded gross growth on the Forest in the early 1990s, a time of large area insect infestations, particularly from Douglas-fir and Western Balsam Bark beetles.

3 **Annual Mortality** – the volume of growing stock trees that die from natural causes during a year.

4 **Nonstocked** – forestland stands less than ten percent stocked with growing stock trees.

TIMBERLAND SUITABILITY

Tentatively suited timberlands have been reassessed as part of Forest Plan revision. Reassessment of tentatively suited timberlands was accomplished in accordance with Forest Planning regulations 36 CFR 219.14 and Forest Service Handbook FSH 2409.13. The National Forest Management Act requires each National Forest to review lands not suitable for timber production every 10 to 15 years. As part of the review, analyses are conducted to determine which lands are capable and tentatively suited for timber production. **Capability** is 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 [36 CFR 219.3]. **Suitability** is 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 the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices [36 CFR 219.3].

Tentatively suited acres are used in the formulation of various management alternatives based on how the Forest can best resolve issues and concerns in other resource areas. These acres represent the forested land area that is available and capable for sustainable timber production. These lands, therefore, represent the maximum number of acres that could be managed for regular and predictable timber outputs, and are the lands used in determining the ASQ.

The assessment was accomplished using Geographic Information System (GIS) technology, monitoring of past projects, and project surveys. Use of GIS provides consistency in identifying data elements, which, when taken together, help identify acres of unsuitable lands. These unsuitable lands are those not capable or available for timber production.

The Forest has approximately 550,000 acres of forestland. Of these acres, approximately 295,000 acres are capable and tentatively suitable for timber harvest. About ten percent of these capable and tentatively suitable acres have been harvested since the mid 1960s. Table 3.54 shows the Forest's Land Classification, including tentatively suitable acres. For more detailed information on how tentatively suitable acres were determined, see Appendix B – Timber Sale Program.

Table 3. 54 Land Classification.

Classification	Acres
1. Non-forest land (includes water)	491,000
2. Forest land	550,000
3. Forest land withdrawn from timber production	1,859
4. Forest land not capable of producing crops of industrial wood	113,000
5. Forest land physically unsuitable – irreversible damage likely to occur or not restockable in five years	141,000
6. Forest land – inadequate information	0
7. Tentatively suitable forest land (Item 2 minus items 3,4,5,6)	295,000
8. Forest land not appropriate for timber production	190,000
9. Unsuitable forest land	445,000
10. Total suitable forest land	106,000
11. Total National Forest System land	1,042,091

Since the 1985 Forest Plan approximately 9,450 acres have been harvested within the Forest's roadless areas. These sales included the construction of 145 miles of new road and 31 miles of reconstruction.

Issue 8

Roadless Area Management and Recommended Wilderness

Roadless Area Management

Analysis Scale: Forest-wide

Issue Statement:

Forest Plan Alternatives propose to manage inventoried roadless areas in a variety of ways.

Issue Indicators:

♦ **RA.1 Acres in management prescription categories 1, 2, and 3 (% of Forest)**

Baseline Indicator: 58 percent of the Forest

♦ **RA.2 Probable acres of timber harvest in Inventoried Roadless Areas.**

Baseline Indicator: Approximately 9,450 acres harvested since 1985

BACKGROUND TO ISSUE

"Roadless Areas" refer to areas that do not have constructed and maintained roads and that are substantially natural. Some types of improvements and past activities are acceptable in inventoried roadless areas.

In the past inventoried roadless areas were only considered for their potential as designated wilderness. It is now recognized that roadless areas have significant ecological, as well as social values, beyond their wilderness consideration. Values of roadless areas can be both local and national in significance. Roadless areas are often aquatic strongholds for fish and provide critical habitat and migration routes for wildlife species, especially those requiring large home ranges. Roadless areas often contain key watersheds for communities. The recognition of the values of roadless areas is increasing, as human populations continue to grow and as the demand for outdoor recreation and other uses of the Forest increase. These undeveloped areas provide the Forest with opportunities for potential wilderness, primitive and semi-primitive recreation, and other commodity and amenity uses. Roadless areas:

- Provide sources of clean drinking water;
- Function as biological strongholds for populations of Threatened and Endangered Species;
- Provide large, relatively undisturbed landscapes important for biological diversity and the long-term survival of many species at risk;

- Present opportunities for primitive, semi-primitive non-motorized, and semi-primitive motorized recreation;
- Serve as bulwarks against the spread of non-native invasive plant species; and
- Offer reference areas for study and research.

Current Conditions

ROADLESS AREA INVENTORY PROCESS

Inventoried roadless areas (IRAs) provide unique opportunities for non-motorized and motorized recreation in a primitive or semi-primitive setting, they are sources of clean drinking water, and offer large undisturbed landscapes for native plant and animal species conserving biological diversity and providing opportunities for study and research. The roadless areas on the Caribou NF have these values to differing degrees. Some are large and relatively undeveloped, while others have past or current development and in some cases, resource damage.

In 1972 the Forest Service began identifying roadless areas for Wilderness consideration through the Roadless Area Review and Evaluation (RARE I). In 1979, the agency completed Rare II, a more extensive national inventory of roadless areas. The Caribou National Forest employed Rare II data to develop inventoried roadless areas (IRAs) for the initial Forest Plan. Appendix C of the Final Environmental Impact Statement (FEIS) for the 1985 Forest Plan provides maps, general descriptions, and a history of each of the roadless areas on the Forest (See page C-2). Thirty-four roadless areas, comprising approximately seventy-three percent of the land base administered by the Forest, were inventoried during the roadless area evaluation in 1985. The Mt. Naomi, Swan Creek and Gibson roadless areas are shared with the Wasatch-Cache National Forest. The Gannett Spring Creek roadless area is shared with the Bridger-Teton National Forest and the Pole Creek, Caribou City and Bear Creek roadless areas are shared with the Targhee National Forest.

The roadless area inventory criteria are contained in Forest Service Handbook (FSH) 1909.12. The Forest began the 2000 analysis process using the 1996 re-inventory roadless area boundaries. Updates were made to document roads and other developments within roadless areas and to validate that all roadless areas have been identified using the criteria contained in Chapter 7 of FSH 1909.12.

The word "roadless" implies to many people that no roads exist in the area; however, criteria state that the area does not " . . .contain improved roads maintained for travel by standard passenger-type vehicles." The easiest way to define a road for inventory purposes is:

If the road is maintained (by blading), constructed, or improved for vehicular traffic, it is considered a road.

Many of the Forest's inventoried roadless areas have unimproved or historic roads. Some of these old roads are managed as designated motorized trails. Private and state lands are excluded from the inventory when possible, but many of these parcels are surrounded by roadless forest acres. The 1996 roadless area re-inventory documents and maps most of these pre-existing constructed roads and the private and state inholdings within the roadless areas. Appendix C (2002) notes the miles of motorized trail within each roadless area.

CURRENT INVENTORIED ROADLESS AREA (IRA) MANAGEMENT

Four IRAs provide culinary and other water needs to the communities of Pocatello, Grace, St. Charles and Paris. The Forest's IRAs do not offer much opportunity for primitive recreation due to their size and the fact that the sights and sounds of human development are often evident from the lower valleys. The Forest's thirty-four roadless areas provide semi-primitive recreation, both motorized and non-motorized. Portions of fourteen IRAs are open to cross-country motorized travel during the snow-free seasons. Most IRAs are open to cross-country snowmobile use.

In 1986 the Forest Plan decision was appealed, and a settlement agreement was reached. The Forest Service determined no timber harvest entries were scheduled in eight roadless areas of concern and agreed to exclude timber harvest in these areas through the year 2000. The settlement areas are: Mount Naomi, Worm Creek, Caribou City, Stump Creek, Toponce, Gannett Spring, Bear Creek, Oxford Peak, Elkhorn Mountain, and Bonneville Peak. Forest Plan revision efforts will address timber scheduling for the year 2000 and beyond making roadless area allocation a part of any Alternatives considered.

ROADLESS AREA RE-INVENTORY PROCESS

Greater accuracy and more refined mapping of "cherry stems" around encroaching roads have increased the original acreage of some Inventoried Roadless Areas (IRAs). Some IRA acres are greater than shown in the 1996 table, since many scheduled developments never occurred. Since 1985, Huckleberry Basin, Scout Mountain, Pole Creek, Schmid Peak, Sage Creek, and Stauffer Creek Roadless Areas have been reduced by more than 20 percent due to timber harvest, roads, and phosphate mining. Pole Creek Roadless Area, at 3,589 acres, has been developed to the extent that it no longer meets the 5,000-acre (2,025 ha) roadless area criteria.

The 1985 acres decrease by 6 percent after GIS adjustments for developments, timber harvest, additions, and other changes, as shown in Table 3.55.

Outside of the settlement areas, IRAs are managed for a variety of uses, predominantly semi-primitive recreation, both motorized and nonmotorized. Most of the prescriptions do allow timber harvest and road building. Under the 1985 Plan, approximately 9,450 acres of timber harvest and

145 miles of new road construction and 31 miles of road reconstruction have occurred in IRAs. Currently, over half of the Forest is managed in less intensive prescriptions in management area categories 1, 2, and 3.

Roadless Area Management is closely related to other topics, including recommended wilderness, and recreation and travel. For further discussion of roadless area's potential for wilderness and wilderness characteristics see the recommended wilderness section and Appendix C. For more discussion on travel access on the Forest, including IRAs, see the Recreation section. For more discussion of the wilderness attributes and recommendations of IRAs for wilderness, see the Wilderness section and Appendix C. For further discussion on Inventoried Roadless Areas, beyond their potential for wilderness, refer to Appendix R for descriptions of each roadless area's soil and watershed condition, habitat value for plants, animals and fish, value as potential reference landscape, primitive and semi-primitive recreation setting and use, and other land uses such as phosphate leases and special use permits.

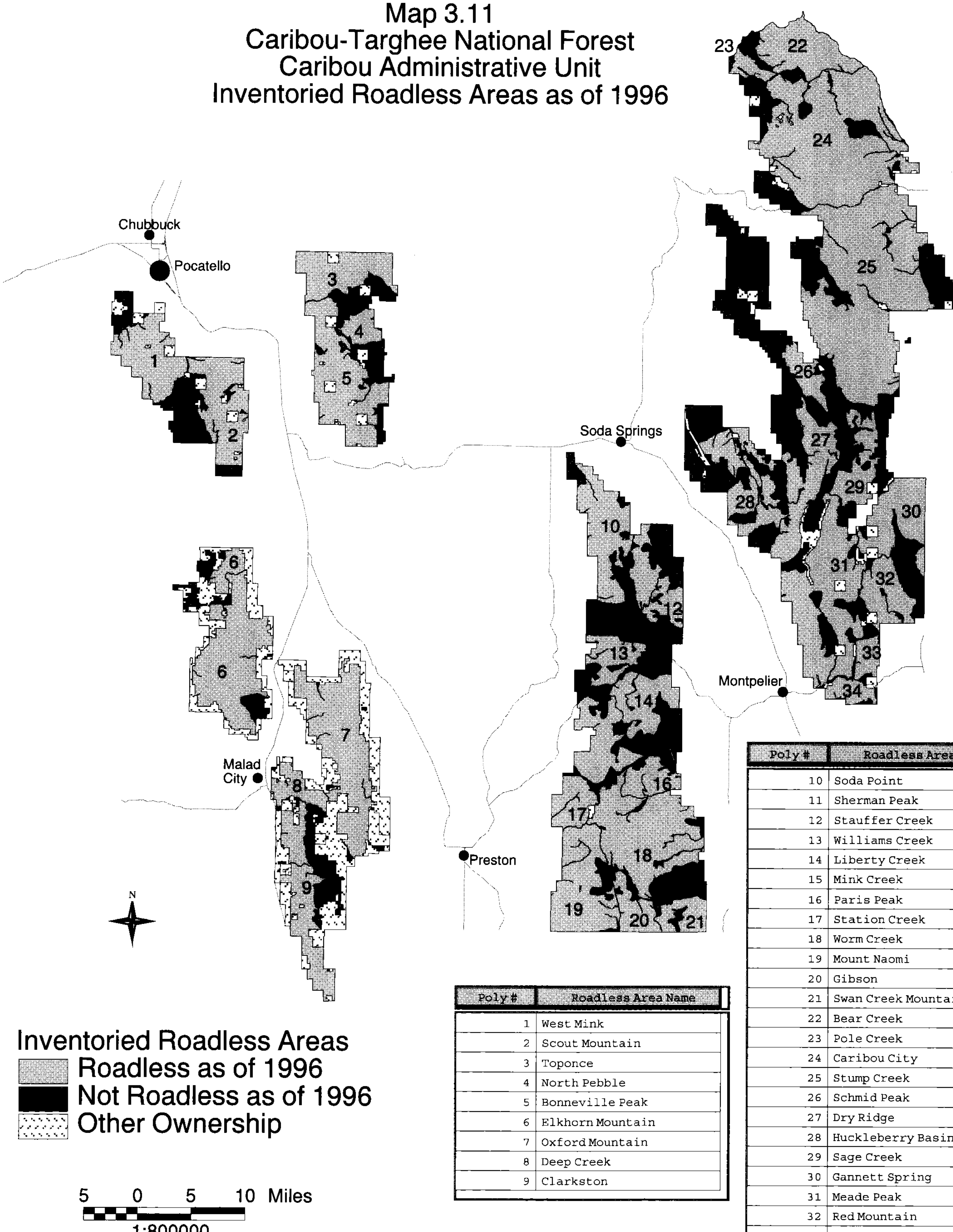
Table 3. 55. Roadless Area Changes (1985 - 1996).

Roadless Area Number	Roadless Area Name	Original Acres Forest Plan (1985)	Original Acres from GIS (1996)	Subtractions due to Development or Corrections since 1985	Additions to due to LEX and Corrections since 1985	Roadless Acres 1996	Scheduled Entry or Change (post 1996)	% Change 1985-1996 (Does not include Scheduled Entry)
04151	West Mink	20,280	21,400	895	147	20,652	-2,353	-3%
04152	Scout Mountain	32,300	30,638	8,028	0	22,610	0	-26%
04153[1]	Toponce	17,060	18,286	0	10	18,296	0	0%
04154[1]	Bonneville Peak	32,210	32,557	357	0	32,200	0	-1%
04155	North Pebble	6,100	6,276	792	0	5,484	0	-13%
04156[1]	Elkhorn Mountain[6]	44,770	44,105	2,114	1,732	43,723	-341	-1%
04157[1]	Oxford Mountain	42,480	41,015	3	59	41,071	-839	0%
04158	Deep Creek	5,360	6,917	0	172	7,089	0	+2%
04159	Clarkston[4 and 5]	14,080	22,498	44	0	22,454	+167	0%
04615[1]	Bear Creek[2]	20,150	21,102	61	0	21,041	0	0%
04160	Pole Creek[2 and 6]	6,220	5,321	1,688	0	3,633	0	-32%
04161[1]	Caribou City[2]	80,710	80,024	0	0	80,024	0	0%
04162[1]	Stump Creek	100,965	101,915	4,534	0	97,381	0	-4%
04163	Schmid Peak	9,650	11,185	4,073	0	7,112	-347	-36%
04164	Dry Ridge	24,420	26,531	3,225	0	23,306	0	-12%
04165	Huckleberry Basin[3 and 6]	30,260	26,890	6,787	0	20,103	-2,913	-25%
04166	Sage Creek[6]	16,810	18,877	6,168	0	12,709	-2,515	-33%
04111[1]	Gannett Spring[2 and 6]	19,700	20,080	371	0	19,709	0	-2%
04167	Meade Peak	42,180	46,918	2,241	0	44,677	-1,553	-5%
04168	Hell Hole	5,830	5,346	36	0	5,310	0	-1%

Roadless Area Number	Roadless Area Name	Original Acres Forest Plan (1985)	Original Acres from GIS (1996)	Subtractions due to Development or Corrections since 1985	Additions to due to LEX and Corrections since 1985	Roadless Acres 1996	Scheduled Entry or Change (post 1996)	% Change 1985-1996 (Does not include Scheduled Entry)
04169	**Telephone Draw**	5,090	4,955	12	0	4,943	0	0%
04170	**Red Mountain**	13,240	13,711	13	0	13,698	0	0%
04171	**Soda Point**	23,150	23,494	373	0	23,121	-2,210	-2%
04172	**Sherman Peak**	7,500	8,025	269	0	7,756	0	-3%
04173	**Stauffer Creek**	7,860	8,336	1,904	0	6,432	-386	-23%
04174	**Williams Creek**	10,540	10,499	603	26	9,922	-683	-6%
04175	**Liberty Creek**	16,800	16,168	1,022	0	15,146	0	-6%
04176	**Mink Creek**	16,300	17,693	1,392	42	16,343	0	-8%
04177	**Paris Peak**	9,200	9,345	529	0	8,816	-536	-6%
04178	**Station Creek**	9,015	9,681	0	0	9,681	0	0%
04179	**Worm Creek**	41,565	42,807	316	0	42,491	-813	-1%
04180	**Swan Creek Mountain**[2]	6,156	8,166	836	0	7,330	0	-10%
04181	**Gibson**[2]	8,500	8,868	548	0	8,320	0	-6%
04758	**Mount Naomi**[2]	28,800	30,871	2,794	0	28,077	0	-9%
	TOTALS	775,251	800,500	52,028	2,178	750,660	-15,322	-6%

1 These are 1985 Forest Plan Settlement Areas
2 These roadless areas do not include the acres of adjoining National Forests.
3 Huckleberry Basin Roadless Area - Total area includes 6 subareas, all less than 5,000 acres.
4 Clarkston Roadless Area - 1985 Forest Plan acres did not include approximately 7,000 acres in Utah. Acres for 1996 include these acres.
5 Clarkston Roadless Area - This roadless area is split into two or more separate areas by roads or development.
6 These roadless areas are split into two or more separate areas by roads or development, and one or more of these separate areas is less than 5,000 acres.

Map 3.11
Caribou-Targhee National Forest
Caribou Administrative Unit
Inventoried Roadless Areas as of 1996



Poly #	Roadless Area Name
1	West Mink
2	Scout Mountain
3	Toponce
4	North Pebble
5	Bonneville Peak
6	Elkhorn Mountain
7	Oxford Mountain
8	Deep Creek
9	Clarkston

Poly #	Roadless Area Name
10	Soda Point
11	Sherman Peak
12	Stauffer Creek
13	Williams Creek
14	Liberty Creek
15	Mink Creek
16	Paris Peak
17	Station Creek
18	Worm Creek
19	Mount Naomi
20	Gibson
21	Swan Creek Mountain
22	Bear Creek
23	Pole Creek
24	Caribou City
25	Stump Creek
26	Schmid Peak
27	Dry Ridge
28	Huckleberry Basin
29	Sage Creek
30	Gannett Spring
31	Meade Peak
32	Red Mountain
33	Telephone Draw
34	Hell Hole

Recommended Wilderness

Analysis Scale: Forest-wide

Issue Statement:

Forest Plan Alternatives will provide various degrees of recommended Wilderness opportunity.

Issue Indicators:

- **WD.1 Recommended to Congress for inclusion in the Wilderness Preservation System**

  Baseline Indicator: 30,600 acres

- **WD.2 Non-motorized opportunity within recommended Wilderness**

  Baseline Indicator: 14,600 acres summer and winter

- **WD.3 Motorized opportunity within recommended Wilderness**

  Baseline Indicator: 16,000 acres summer and winter

BACKGROUND TO ISSUE

IRAs that strongly possess many of these wilderness characteristics are often top candidates for wilderness recommendation. It is important to note that there is a difference between evaluating the IRA for wilderness potential and evaluating the IRAs for effects on their roadless characteristics. This section discusses IRAs potential for wilderness, considering their wilderness attributes. The Roadless Section of the FEIS discusses the roadless characteristics and their value.
Appendix C discusses individual roadless areas and their wilderness potential. Appendix R evaluates individual roadless areas for other management uses and values, beyond Wilderness recommendations.

The Forest Service recommends areas for inclusion into the National Wilderness Preservation System through the Forest Plan process. Only Congress, through the legislative process, can designate wilderness. Designations are often controversial and may take many years to pass Congress. Congress may also change recommended wilderness boundaries, based on public comment, political issues, and other factors.

In 1972 the Forest Service began identifying roadless areas for wilderness characteristics. (For more discussion on the inventory process please see the Roadless Area section). In 1985, the Caribou National Forest identified thirty-four inventoried roadless areas (IRAs) for the initial Forest Plan. The IRAs comprise approximately seventy-three percent of the land base administered by the Forest.

The *Initial Analysis of the Management Situation* (1999) did not identify a need to modify the Wilderness recommendation made in the 1985 Forest Plan. Public scoping indicated that many people wanted the original Wilderness recommendation analyzed as part of the revision process. Public comment also wanted motorized travel in recommended Wilderness areas evaluated.

Under the National Forest Management Act, National Forests are required to re-evaluate and re-inventory roadless areas for possible inclusion in the National Wilderness Preservation System as part of Forest Plan revisions. The Forest completed a new analysis, Appendix C, of all roadless areas for possible inclusion in the National Wilderness Preservation System. Wilderness attributes are the basic characteristics that make a roadless area suitable for wilderness consideration. Wilderness attributes include:

- Natural Integrity
- Apparent Naturalness
- Opportunity for Solitude
- Opportunity for Primitive Recreation
- Challenging Experiences
- Special ecological, geological, or cultural features

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 the state are final. 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.

Current Conditions

The 1985 Forest Plan recommended 16,000 acres (6,480 ha) of the Worm Creek Roadless Area and a 14,600-acre (5,913 ha) section of Mount Naomi in Idaho for Wilderness designation. Mt. Naomi Roadless Area is adjacent to the Mt. Naomi designated Wilderness in Utah. The Mt. Naomi recommended Wilderness is managed as non-motorized year-round. Worm Creek recommended Wilderness is managed for summer motorized use on designated routes and open to snowmobiles during the winter.

The thirty-four IRAs were evaluated for their wilderness potential using three primary criteria:

Wilderness Capability – the degree to which the area contains the basic characteristics that makes it suitable for wilderness designation without regard to its availability or need a wilderness. Characteristics such as naturalness of the environment, the presence of challenging and primitive experiences and feelings of solitude are evaluated. Another aspect considered is the ability to manage the area as wilderness. Factors such as size, shape, and an area's relationship to external influences are considered when determining recommended boundaries.

Wilderness Availability –other resource demands and uses of an area. Consideration if current constraints or encumbrances are important.

Wilderness 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 can afford.

WILDERNESS CAPABILITY

The IRAs were evaluated on the manageability of the existing roadless area boundaries; however, core areas within roadless areas could be more "manageable" as designated Wilderness. Recommended wilderness boundaries are proposed for reasons of manageability and to exclude major road intrusions. Watershed boundaries, prominent ridges or distinct features that are definable on the ground help towards management and enforcement.

In discussing an area's "capability" as potential wilderness; challenge, outdoor recreation opportunities, special features and manageability are all considered. Areas inventoried for wilderness potential with high capability include Mt. Naomi, Caribou City, Stump Peak and Worm Creek.

Appendix C identifies two areas of high capability that also have unique or special features. Portions of Caribou City roadless area have historic mining sites and the remains of two mining towns. There is a high public interest in this historic area. Portions of the Caribou City roadless area also offer a unique recreation opportunity for the region. The core area of Caribou City roadless area that is currently managed as non-motorized during the snow-free season also provides quality elk habitat. This core area offers the only ROS experience of "Primitive" on the Forest and is very popular with hunters who prefer a non-motorized experience. Bloomington Lake, within the Worm Creek Roadless Area, is a unique landform and has unique flora and fauna. There is high public interest in how this area is managed for recreation and how the rare setting of the alpine lake will be protected. The Bloomington Lake area is currently managed as non-motorized.

WILDERNESS AVAILABILITY

All National Forest System land found to meet wilderness capability requirements generally is available for wilderness consideration. However, the availability is constrained by a determination of the value of and need for the wilderness resource relative to the value and need for other resources for the site. To be available for wilderness, the wilderness values of the resource, both tangible and intangible, should exceed the value of other resources that formal wilderness designation would preclude.

Portions of some IRAs are leased for phosphate mining (see Roadless part of this Issue). This activity would be incompatible with wilderness designation. Most IRAs contain areas under special use authorization for grazing, which can be compatible with wilderness designation. Other authorized uses within IRAs include outfitting and guiding, water transmission, and small power lines.

Wilderness Need

FSH 1909.12-7.23 directs the Forest Service to "determine the need for an area to be designated as Wilderness through an analysis of the degree to which it contributes to the local and national distribution of Wilderness". Need is addressed on a national basis and is evaluated in terms of the geographical distribution of areas, representation of landforms and ecosystems, and the presence of wildlife expected to be visible in Wilderness. Assessment of need is divided into two categories: biological need (landform representation and biodiversity) and social need (outdoor recreation opportunities).

Biological Need

Six designated wilderness areas represent regional landscapes and ecosystems. The Mt. Naomi Wilderness in Northern Utah represents an alpine ecosystem with many lakes and streams, vegetation includes aspen and mixed conifer. The Bridger Wilderness has an elevation range of 13,804 feet above sea level to 8,000 feet above sea level and represents a variety of glacial landforms and habitat for moose, deer, elk, and bighorn sheep. The Teton Wilderness has an elevation range of 7,500 feet to 12,165 feet above sea level and offers habitat for trumpeter swans, grizzly and black bears, and bighorn sheep. The Jedediah Smith Wilderness also represents a high elevation ecosystem at approximately 10,000 feet above sea level on the "backside" of the Tetons. The Winegar Hole Wilderness Area represents landforms of volcanic origin, elevations range from 6,020 feet to 6,985 feet above sea level. Vegetation types include lodgepole pine, Douglas-fir and subalpine fir. This area is prime habitat for grizzly bear and trumpeter swan.

Social Need

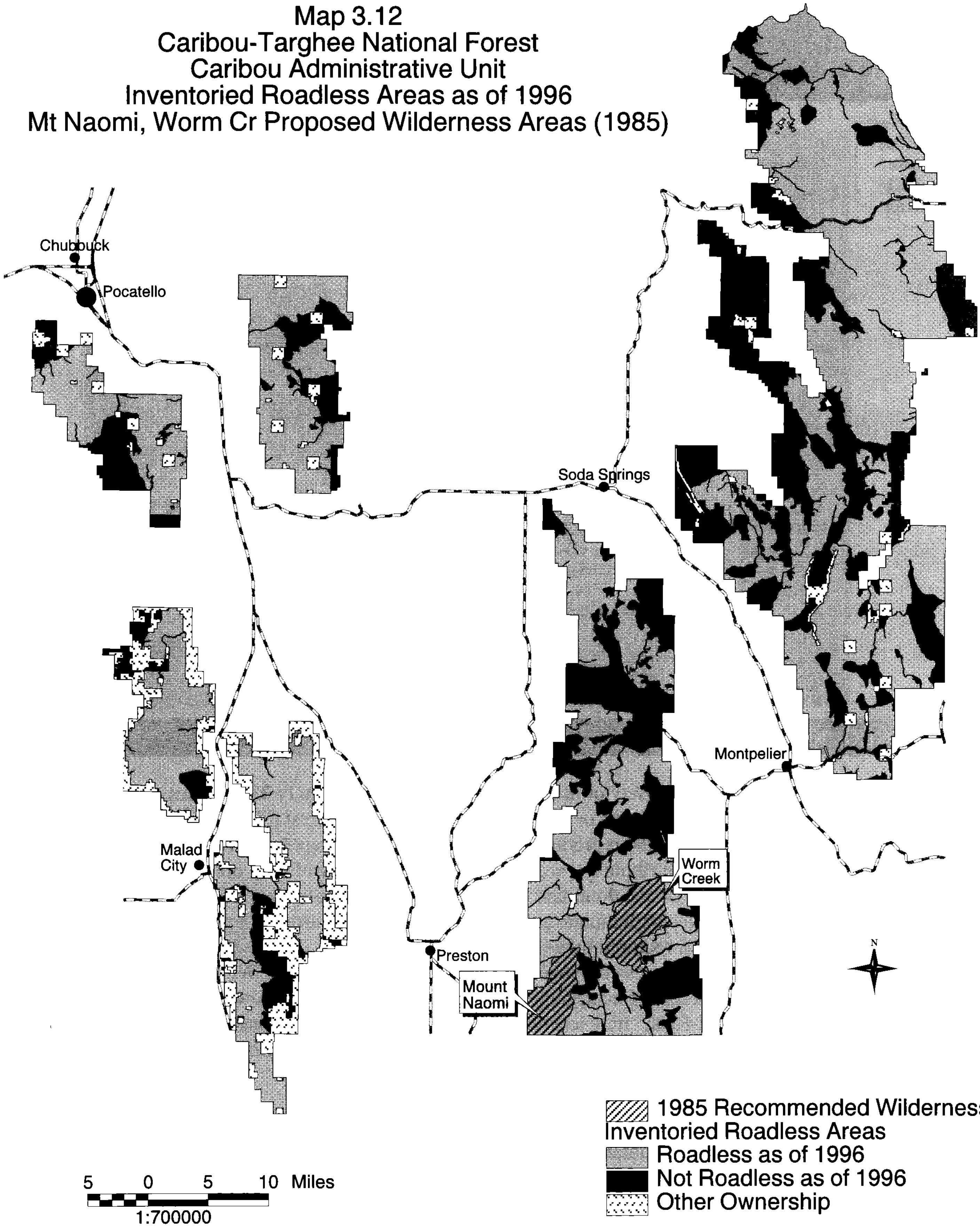
Approximately 4,006,000 acres have been designated Wilderness in Idaho, over 760,000 acres have been designated Wilderness in Utah, and over 2,922,000 acres have been designated in Wyoming. (Wilderness Preservation System, on-line data, USFS). The Frank-Church River of No Return Wilderness, the Jedediah Smith Wilderness, the Winegar Hole Wilderness, and Mt. Naomi Wilderness are within a five-hour drive of Pocatello and other southeast Idaho communities. Public comment included interest in having wilderness opportunities readily available to local populations. Other comments stated that the region has ample wilderness opportunities already available

For a more detailed discussion on the wilderness potential of each IRA, see Appendix C.

Summary

Currently 30,600 acres are recommended for Wilderness in the Mount Naomi and Worm Creek Roadless Areas. The Mt. Naomi recommended Wilderness is managed as non-motorized year-round. In Worm Creek, motorized use is allowed on designated routes in the summer (snow-free) season and cross-country motorized use is allowed in the winter.

Map 3.12
Caribou-Targhee National Forest
Caribou Administrative Unit
Inventoried Roadless Areas as of 1996
Mt Naomi, Worm Cr Proposed Wilderness Areas (1985)



Issue 9

Wildlife Habitat Management

Analysis Scale: Varies by Species

Issue Statement:

Decisions made in the Forest planning process can alter wildlife habitats.

Issue Indicators:

♦ **WL 1 Viability analysis based on wildlife habitat outcomes for each alternative.**

Forest vegetation associated species
Rangeland vegetation associated species
Riparian vegetation associated species

Baseline Indicators:
Forested vegetation associated species- **moderate risk**;
Rangeland vegetation associated species- **low risk**;
Riparian vegetation associated species-**moderate risk**

♦ **WL 2 Determine how habitats contribute toward state game population management goals objectives using qualitative "poor, good, better, best" ratings**

Summer habitat effectiveness
Hunting season vulnerability
Acres managed for winter range

Baseline Indicators: Habitat contributes toward state population management goals in most areas.

BACKGROUND TO ISSUE

The Forest provides a wide variety of diverse habitats for approximately 334 species of terrestrial vertebrate wildlife known or suspected to occur on the Forest. These habitats provide cover, forage, water, and reproductive sites for mammals, reptiles, birds, and amphibians, all of which contribute towards the biological diversity of the Forest. The habitats are not comprised of one dominant vegetation type, rather a variety of vegetation species and structural stages with unique environmental conditions arrayed across the landscape providing niches required by wildlife species (Thomas, USFS, 1979). Habitats can be broadly classified as forested, rangeland, and riparian cover types. Within these types reside several wildlife species of management concern. These species, known as "Sensitive Species" and "Species-at-Risk," may receive additional management emphasis to ensure their populations do not decline, leading to a trend in federal listing under the Endangered Species Act (ESA).

The National Forest Management Act (NFMA) 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." It further defines a viable population as "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed throughout the planning area." The regulations [36 CFR 219.19] also 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 unit."

Current Conditions

Viability Analysis

To assess viability of species on the Forest, a list of "species-at-risk" was identified from several sources: 1) the existing Threatened, Endangered, and Sensitive Species were incorporated; 2) the Conservation Data Center (CDC) lists were reviewed for incorporation of Species of Special Concern (SSC); 3) species from the Interior Columbia Basin Ecosystem Management Project (ICB) study and bird species from the Idaho Bird Conservation Plan (IPIF, 2000) were reviewed for incorporation as appropriate; and 4) the list of Species of Concern from the USFWS (September, 2000) was reviewed for incorporation as appropriate.

Idaho herpetology and vertebrate specialists reviewed the draft list from these sources. Charles Peterson, Department of Biological Sciences, Idaho State University, reviewed the amphibians and reptiles section. Charles Harris, Principal Wildlife Research Biologist for Idaho Fish and Game (IDFG), Non-game and Endangered Wildlife Program (CDC), reviewed the remaining species on the draft list. Review comments were incorporated. The rationale for selection of species is explained in detail in the Wildlife section of Appendix D.

It is not feasible to consider all Species-at-Risk in detail in the planning process. Consequently, a process was developed to identify subsets of species to focus conservation measures and determine additional analysis needs. All Threatened, Endangered, Sensitive and Management Indicator Species are discussed individually at the (fine-filter analysis). Three species-at-risk, the northern leopard frog, pygmy rabbit and marten, appeared to need more specific analysis based on habitat outcomes from ICB (2000). In addition, the boreal (western) toad was added due to concerns about this species on the Forest. These species are discussed individually in the fine-filter analysis.

Most of the other Species-at-risk are discussed at the coarse-filter level and are grouped based on habitat associations. These species are secure globally, and viability of the species is not an issue at the forest planning level.

THREATENED, ENDANGERED AND PROPOSED SPECIES

The U.S. Fish and Wildlife Service (FWS, 2000) has identified five terrestrial wildlife species protected under the Endangered Species Act which are known or suspected to occur on the Caribou National Forest (See Table 3.41). Currently, the 1985 Forest Plan provides general direction for overall management of listed species habitat by directing that "identified critical habitats for Threatened and Endangered plant and animal species will be maintained or improved" (USFS, 1985). Several changes have occurred in listed species since 1985, and they are discussed below.

Table 3. 56 Threatened and Endangered Species Identified by the USFWS as Known or Suspected to Occur on the Caribou National Forest and Associated Habitats.

Species	Status[1]	Forest	Rangeland	Riparian
Gray wolf (*Canis lupus*)	LE;XN	X	X	X
Whooping crane (*Grus americana*)	LE;XN			X
Bald eagle (*Haliaeetus leucocephalus*)	LT	X	X	X
Canada lynx (*Lynx canadensis*)	LT	X		
Yellow-billed cuckoo (*Coccyzus americanus*)	C			X

1 LE = Listed, Endangered; XN = Experimental/Non-essential; LT = Listed, Threatened; C = Candidate

On July 21, 1997, the U.S. Fish and Wildlife Service (USFWS) published a final rule designating the whooping cranes of the Rocky Mountains as an experimental, nonessential population. The USFWS also removed critical habitat designation from the Grays Lake National Wildlife Refuge and a one-mile buffer around the Refuge that included a portion of the Soda Springs Ranger District. Because the experimental, non-essential population is down to one bird, this species may soon be dropped from consultation lists (L. Dickerson, USFWS, pers. comm.).

In August of 1999, the peregrine falcon was removed from the Endangered Species list. At that time, the USFWS decided to monitor for thirteen years and conduct surveys at least once every three years to provide data on two generations. This species will be addressed further as a Sensitive Species.

The lynx was listed as a Threatened species in March 2000. In the Final Rule, the USFWS concluded that the factor threatening the contiguous U.S. distinct population segment of lynx is the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in Forest Service and BLM Management Plans.

The Columbian sharp-tailed grouse was petitioned for listing in 1995. In October of 2000, the USFWS determined listing was not warranted. The review showed that some smaller, isolated populations are currently at risk of extinction, but numerous larger populations are relatively secure and possibly increasing. This species will still be analyzed as a Sensitive Species.

The greater sage grouse was petitioned for listing in July 2002. A second petition also was submitted fro the Mono County, California sage grouse population. The Gunnison's subspecies and the Washington population also have been petitioned. The USFWS found that listing the Washington population was warranted but precluded due to higher priorities. Other possible petitions may occur for other populations, mostly focused on the Great Basin. This species is a Management Indicator Species.

The yellow-billed cuckoo was petitioned for listing in 1998. In 2001, the USFWS determined that listing was warranted but precluded due to higher priorities. In Idaho, this species is considered a rare and local summer resident. The most recent record for this area was along the South Fork of the Snake River. This species and its habitat are addressed in the following section.

CANADA LYNX

In the contiguous United States, the distribution of lynx is associated with southern boreal forest, comprising subalpine coniferous forest in the West (Lynx Conservation Assessment and Strategy, 2000). Lynx are most likely to persist in areas that receive deep snow, for which the lynx is highly adapted. Lynx in the contiguous United States are part of a larger metapopulation whose core is located in the northern boreal forest of central Canada. At the southern margins of their distribution, habitat becomes naturally fragmented into patches of varying size as it transitions into other forest types. Some of these patches serve as sources, while others may function as sinks, where lynx mortality is greater than recruitment.

For denning sites, lynx use large woody debris that provides security and thermal cover for kittens, such as downed logs and windfall. The age of the stand does not seem as important as the amount of downed woody debris available.

Lynx are highly specialized predators whose primary prey is snowshoe hares. Snowshoe hares use forests with dense understories that provide forage cover to escape from predators and for protection during extreme weather. Snowshoe hares provide the high quality prey necessary to support high-density lynx populations. Relative densities of snowshoe hares at southern latitudes are generally lower than those in the north.

Lewis and Wenger (1998) collected information on lynx sightings and records in Idaho. They found several records from the Forest: Skinner Canyon, Georgetown Canyon, Tincup Creek, Home Canyon, the Trail Canyon area and Big Rattlesnake Canyon (Bear River, Preuss, and Caribou ranges). The Conservation Data Center (CDC) has some additional records of lynx on the Caribou-Targhee National Forest. However, the paucity of historical records suggests that there has never been a viable population of lynx on the Caribou National Forest (Orme, pers. comm., 2002)

To date, no lynx hair samples have been identified in the on-going lynx hair snare grid survey on the Caribou portion of the Forest after two years of sampling. To the north, eight years of sampling seasons have been completed on the Targhee portion of the Forest, and no lynx hair samples have been found (Caribou-Targhee National forest Plan Monitoring and Evaluation Reports, 1997-1999 and 2000-2001).

At a meeting in September 2001 it was jointly decided by managers of the Caribou-Targhee NF and the U.S. Fish and Wildlife Service that primary vegetation types on the Caribou portion of the Forest were too patchy and disjunctive to provide suitable lynx habitat. It was agreed that the Caribou portion would be dropped as suitable lynx habitat, and no lynx analysis units would be delineated. As a result of this meeting, the Montpelier and Soda Springs Ranger Districts have been identified as potential linkage habitat, while the Westside Ranger District is not considered linkage habitat. (See Biological Assessment and the Wildlife section of Appendix D for more information on potential lynx linkage habitat and maps.)

GRAY WOLF

The gray wolf was listed as Endangered in 1978. In 1994, the USFWS signed the decision to reintroduce wolves into Greater Yellowstone Area and Central Idaho as nonessential experimental populations (USFWS, 1994). Interstate 15 is the division between the Central Idaho and Yellowstone populations. As a result, the Forest is split between the two recovery areas.

Table 3. 57 Breeding Pairs in Yellowstone (GYE) and Central Idaho Recovery Areas (USFWS, 2000).

Recovery Area	1995	1996	1997	1998	1999	2000	2001
GYE	2	4	9	6	8	14	13
Central Idaho	-	3	6	10	10	10	14

In July of 2000, the USFWS began the process to reclassify and de-list wolves over much of the United States (USFWS, 2000). The Western population would be reclassified from Endangered to Threatened. The non-essential, experimental status of wolves in Yellowstone and central Idaho would remain (USFWS, 2000).

Numerous sightings of suspected wolves have been reported across the Forest over the last ten years. All were of lone, individual animals. No sighting of packs or evidence of breeding on the Forest has been reported. Wildlife Services removed a wolf that had killed sheep near Soda Springs in November 2000. The animal was sent to a forensics lab so that its origin may be established. (See the Biological Assessment for more information on wolves.)

WHOOPING CRANE

During the 1970s the USFWS attempted to establish a flock of whooping cranes at Grays Lake National Wildlife Refuge by "cross-fostering," allowing sandhill cranes to hatch and raise young whooping cranes. To date, the whooping cranes have shown no evidence of pairing or breeding. The "cross-fostering" program terminated in 1989, because the birds were not pairing, and mortality was too high to establish a self-sustaining population. In 1997, the USFWS designated the Rocky Mountain population of whooping cranes as an experimental, nonessential population (USFWS, 1997).

Numbers of whooping cranes have declined over the years, and the probability of whooping crane occupancy on the Forest is very low. In 1992, twelve whooping cranes returned to the Refuge. By the spring of 1995, only four returned, one of which remained for the summer. By 1997, numbers in the Rocky Mountain population had dropped to three non-breeding birds. An unconfirmed sighting of one bird was reported in July 2000 on private land between Soda Springs and Blackfoot Reservoir. Until a pair of whooping cranes is observed using a Forest habitat for at least two consecutive years or has established a nesting territory on the Forest, the cranes are not considered Forest residents.

The last known whooping crane in the Rocky Mountains has not been seen since winter of 2001-2002. According to Tom Stehn, USFWS Whooping Crane Coordinator, it is highly unlikely that the crane is alive. Thus, it is the opinion of the USFWS that the experimental nonessential Rocky Mountain whooping crane population is now extinct (Stehn, 2002).

Whooping Cranes may be removed from consultation lists for the State of Idaho (L. Dickerson, USFWS, pers. comm.). For these reasons, they will not be discussed further in this EIS.

BALD EAGLE

The Forest is part of the Pacific Recovery Region. The Pacific States Bald Eagle Recovery Plan was developed in 1986 (USFWS, 1986). Due to achievement of recovery goals in 1995, the USFWS reclassified the bald eagle from Endangered to Threatened status in the lower forty-eight states (USFWS, 1995). The USFWS continues to move forward with plans to de-list the bald eagle, and are working on addressing post de-listing population monitoring and continued protection of habitat once the population is de-listed.

The Forest is within three bald eagle management zones identified in the Recovery Plan; Caribou/Green River (Zone 19) in the southern part of the Forest, the Greater Yellowstone (Zone 18) in the northeast part, and Great Basin (Zone 37) in the northwestern part of the Forest.

Two nesting territories are located on or adjacent to the Forest: one in Wyoming and one in Idaho. Both of these territories are within the Greater Yellowstone Management Area. The nesting territory on National Forest land is found near Thayne, Wyoming. Much of the following information was taken from the Bald Eagle Nest Area Management Plan (Brassfield, 1998). The Nest Area Management Plan has been approved by the USFWS and includes land management recommendations.

The territory has been occupied since 1977 and includes at least three nest sites, two of which are on National Forest lands. Nesting in the territory was documented during 1977, 1980-84, and 1991-98. A nesting pair produced one or two fledglings in 1991-97. In 1994 the nest was occupied, but the pair failed to produce fledglings. Surveys in 1999 and 2000 reported eagles in the area, but no nesting was documented. The territory is considered occupied but inactive for the last two years (S. Patla, Wildlife Biologist, Wyoming Game and Fish, pers. comm.). In 2001 and 2002 the eagles nested on adjacent private land. The nest appeared to fail in 2001, but one nestling was observed in June 2002.

The other nest territory is found on Grays Range. The nest area is mostly off-Forest, but one nest tree may be within the Forest boundary. This nest was first observed in 1996. (See Biological Assessment for more information.)

Other nest territories have been found in the vicinity of the Forest. One nest was confirmed at Blackfoot Reservoir for one year and one nest at Alexander Reservoir in 1999. Efforts to relocate the nest in 2000 were unsuccessful (Carl Anderson, IDFG, pers. comm.). In addition, reports of nests around Thatcher (1998) and Sulphur Canyon (1995) were investigated, but no nesting could be confirmed (Carl Anderson, IDFG, pers. comm.).

During the breeding season, bald eagles eat mainly fish. They also forage on waterfowl, shorebirds, upland birds, and small mammals. Eagles are very opportunistic predators, especially during winter. They eat whatever is available, including fish, waterfowl, small mammals, and carrion.

Nesting habitat on or adjacent to the Caribou NF is associated with rivers, lakes, and reservoirs. Nests are commonly found in large trees, mainly conifers and cottonwoods. Because eagles need large trees to support their large, heavy nests, they are often found in multi-storied, late successional stands with open canopies.

Wintering bald eagles tend to roost communally and congregate near bodies of open water. Major rivers and large lakes constitute the majority of winter habitats used, although temporary presence of high quality foods may entice eagles to areas far removed from aquatic zones (Greater Yellowstone Bald Eagle Working Group, 1996). Four areas of known bald eagle winter use have been surveyed once yearly since 1986. These areas are Tincup (nine eagles over fifteen years), Diamond Creek (two eagles in twelve years), Narrows/Lane Creek (eight eagles in thirteen years), and Crow Creek (sixteen eagles in fifteen years).

WESTERN YELLOW-BILLED CUCKOO

Western yellow-billed cuckoos breed in large blocks of riparian habitat, especially woodlands with cottonwoods and willows. Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat in areas of California where they have been studied. These birds appear to be dependent on large blocks of cottonwood/willow habitat of more than twenty hectares (50 acres). No areas of potential habitat have been identified on the Forest.

SENSITIVE SPECIES

Sensitive Species are those species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current and predicted downward trends in population numbers, density, and/or habitat capability that would reduce a species' existing distribution (USFS, FSM). Sensitive Species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that could result in the need for federal listing (FSM 2672.1). Objectives for Sensitive Species should be included in

the Forest Plan to ensure viable populations throughout their geographic range (FSM 2672.32)."

The Forest has thirteen species of terrestrial wildlife designated as Sensitive. Of those thirteen, seven are primarily associated with forested habitats, two are primarily associated with rangeland habitats, and four are primarily associated with riparian/wetland habitats during all or a portion of their lives.

Table 3. 58. Sensitive Fauna Identified by the Regional Forester Known or Suspected to Occur on the Caribou National Forest and Associated with Forested, Rangeland and Riparian Communities.

Sensitive Wildlife	Forest	Rangeland	Riparian
Spotted bat (*Euderma maculatum*)		X	
Western big-eared bat (*Corynorhinus townsendii*)	X		
Wolverine (*Gulo gulo*)	X		
Boreal owl (*Aegolius funereus*)	X		
Flammulated owl (*Otus flammeolus*)	X		
Great Gray owl (*Strix nebulosa*)	X		
Northern goshawk (*Accipiter gentilis*)	X		
Trumpeter swan (*Cygnus buccinator*)			X
Harlequin duck (*Histrionicus histrionicus*)			X
Three-toed woodpecker (*Picoides tridactylus*)	X		
Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*)		X	
Spotted frog (*Rana luteoventris*)			X
Peregrine falcon (*Falco peregrinus anatum*)			X

Of the thirteen species, the harlequin duck is not likely to occur on the Forest. The only potential area is McCoy Creek, and most suitable habitat is on the Targhee portion. The spotted frog is not expected to be present. There are no reported observations of trumpeter swans, and they are unlikely to occur. These three species are not discussed further, but more information is found in the Wildlife section of Appendix D and Biological Evaluation.

Chapter 4 and the Wildlife section of Appendix D include more information on all of the sensitive species and suitable habitat on the Forest. Appendix D also includes maps for many of the species.

WESTERN BIG-EARED BAT *(TOWNSENDS)* (CLARK, 1989)

The Western big-eared bat is found throughout much of western North America. This species is not abundant anywhere and is uncommon to rare over much of its wide range. They are known in several locations: in Yellowstone and Grand Teton National Parks to the northeast, and the Craters of the Moon area to the northwest. Two known maternity roosts are located

in Idaho at Crater of the Moon (Idaho Conservation Effort, 1995). Population trends are not well documented, but the most serious factor leading to perceived population declines is the loss and/or disturbance of suitable breeding habitat as a result of recreational caving and abandoned mine closures (Idaho Conservation Effort, 1995). Wisdom, *et al,* (2000) predicted that habitat trends have remained constant in the Interior Columbia Basin.

This species occupies moist forests, as well as arid savannah and shrub-steppe. It has been found foraging over sagebrush-grasslands, riparian areas, open pine forests, and arid scrub within the Greater Yellowstone Ecosystem. The bat forages well after dark and selectively forages for nocturnal moths and occasional flies and beetles.

These bats will occasionally take shelter in buildings but do not tolerate a hot, dry roost environment for long periods. Males are solitary or occur in small groups, while females form maternity colonies in suitable warmer caves. Hibernation occurs in local caves that range from 42.8 – 53.6 degrees F.

Cave and abandoned mine surveys on the Forest have found Townsends big-eared bats present. These structures are used for both summer roosts and winter hibernacula. Use has been documented in the Bear River Range, Preuss Range, Portneuf Range and Elkhorn Mountains. Of eighteen caves and mines surveyed on the Montpelier Ranger District during the winter, eleven were found to have low numbers of Western big-eared bats (Lengas, 1996). Of twelve caves and mines surveyed on the Montpelier Ranger District during the summer, five had low numbers of Western big-eared bats (Lengas, 1995). No large concentrations were found in any season.

SPOTTED BAT

Spotted bats use a variety of habitats including open ponderosa pine, desert scrub, pinyon-juniper, and open pasture and hay fields. They roost alone in rock crevices high up on steep cliff faces. Cracks and crevices ranging in width from .8 to 2.2 inches in limestone and sandstone cliffs are critical roosting sites. Spotted bats are rare and may be limited by suitable roosting habitats. Their food habits are poorly known, but previous studies have shown that they forage primarily on moths. Spotted bats are thought to migrate south for the winter, but information on seasonal movements and winter activity is very limited.

Wisdom, *et al,* (2000) predicted that habitat conditions for this species have remained constant across the Interior Columbia Basin. The spotted bat is known from the northeastern portion of the Greater Yellowstone Area in Montana and Wyoming. Groves, *et al,* (1997) indicate that extensive surveys in Idaho have only recently located this species in the southwestern part of the state. More recently, a spotted bat was found during surveys on the Middle Fork of the Salmon River. The Forest falls between known populations. Surveys on the Forest have not documented this species in the area, but this is a difficult species to survey. This species may be present in appropriate habitats.

WOLVERINE (RUGGERIO, 1994)

Researchers generally agree that wolverine habitat is probably best defined in terms of adequate year-round food supplies in large, sparsely inhabited areas rather than in terms of topography or vegetation. Wolverine populations have generally been pushed into the least developed habitats, and the perception has resulted that wolverines are high-elevation species. Home ranges are very large, with male home ranges typically larger than those of females.

Wolverines are generally described as opportunistic omnivores in summer and primarily scavengers in winter. Studies have shown the importance of large mammal carrion, and the availability of large mammals underlies the distribution, survival, and reproductive success of wolverines. During the snow-free periods, diets are more varied and include berries, small mammals, squirrels, and insect larvae.

Wolverines breed during the summer, but because of delayed implantation, they do not give birth until late winter/early spring. Natal dens are excavated in snow and usually are found in areas with snow-covered tree roots, log jams, or rocks and boulders.

In 1987, Idaho Fish and Game reviewed the status of wolverine in Idaho (Groves, 1987). Probable reports of wolverines on the Forest were received (one each in Bonneville, Caribou and Bannock Counties). The low number of wolverine reports was attributed to the roadless nature of the Forest and resultant lower density of people.

In 1999, the distribution of wolverines in the northwest United States was reviewed (Edelmann and Copeland, 1999). While the focus of the study was in west-central Idaho, the sightings map shows seven locations in southeast Idaho. The authors recognized that while this is a first step in identifying subpopulations in the northwest, additional information on: 1) reproducing subpopulations; 2) source-sink habitat patches; 3) movement corridors; and 4) movement patterns between subpopulations is necessary to understanding regional population status. Because wolverines are found in such low densities, population characteristics and trends are difficult to monitor.

From scattered sightings it appears that a sparse wolverine population may exist, or at least travel throughout southeastern Idaho and northern Utah. In 1995, camera/bait station surveys were conducted in the Franklin Basin area of the Bear River Range (Groves, 1987). No wolverines were documented during these surveys. In March 1996, aerial surveys for wolverines were done within selected lands of the Bear River Range (Bissonette, 1997). Four potential track sightings were documented at that time. Some of the higher peaks appeared to provide talus communities consistent with central Idaho denning habitat, but potential denning sites within the survey area were not extensive.

Aerial surveys were also conducted in the late winter/early spring of 2002. These surveys documented wolverine trails in the Bear River Range and in the mountains east of Soda Springs (M.Orme, Forest Biologist, pers. comm.).

A confirmed wolverine sighting occurred in Hillyard Canyon of the Bear River Range in October 1993. Another observation was reported in Wood Canyon on the south end of the Preuss Range in May 1992. In 1992 a sighting was reported in the Pebble Guard Station area of the Portneuf Range. The Conservation Data Center (CDC) reports several observations within the vicinity of the Forest. The 2000-2001 and 1997-1999 Caribou-Targhee National Forest Plan Monitoring and Evaluation reports include more detailed information on wolverine surveys on the Forest.

PEREGRINE FALCON

The Forest is within the American Peregrine Falcon Recovery Plan Area, Rocky Mountain/Southwest Population. By 1999, at least 1,650 peregrine breeding pairs were documented in the United States and Canada, well above the recovery goal of 631 pairs. At that time the peregrine falcon was removed from the Endangered Species list (USFWS, 2000). USFWS decided to monitor the peregrine falcon for thirteen years with surveys occurring once every three years, allowing for five surveys, to provide data that reflect the status of at least two generations of peregrines. If it becomes evident during this period that the bird needs the Act's protection, the Service will re-list the species.

In Idaho, numbers have been increasing as a result of a reintroduction effort in the late 1980s. The following table displays occupied territories, new territories, and number of young fledged at five-year intervals from 1990 through 2000.

Table 3. 59 Peregrine Falcon Productivity in Idaho.

	1990	1995	2000
Occupied Territories	9	13	23
New Territories	6	1	2
Number of young fledged	16	16	36

Peregrine falcons occupy a wide range of habitats and are typically found in open country near rivers, marshes, lakes, and coasts. They capture prey by striking from above with their talons after a high-speed dive. Foraging habitat includes wetlands and riparian habitats; meadows and parklands; croplands, such as hayfields and orchards; gorges and mountain valleys; and lakes which support good populations of small to medium terrestrial birds, shorebirds, and waterfowl.

Cliffs are preferred nesting sites, although reintroduced birds now regularly nest on man-made structures such as towers and high-rise buildings. Peregrines may travel more than eighteen miles from the nest site to hunt for food; however, a ten-mile radius around the nest is an average hunting area, with eighty percent of foraging occurring within a mile of the nest.

Known historic peregrine nesting cliffs were found at Grays Range and Joe's Gap. Potential cliffs that have been identified include Harkness Canyon, Robbers Roost, West Bob Smith and Big Canyon drainages in the Portneuf Range.

In 1989 Grays Lake National Wildlife Refuge was recommended as a release (hack) site in Idaho. The Grays Lake tower on the Wildlife Refuge has been occupied almost yearly, except for 1999.

In 1996 a new nest site was found on the Forest, Grays Lake South (Grays Range). The nest was on a cliff and produced one young. In 1997 this site produced two young. In 1998 the site was unoccupied. In 1999, the site was occupied but produced no young. In 2000 one young was produced (Levin, *et al*, 2001).

In 1999 another nest site was found near the Forest on BLM land near Soda Springs. One young was produced but not successfully fledged (Levine, *et al*, 1999). Three young were produced in 2000 (Levine, *et al*, 2001).

Boreal Owl (Hayward and Verner, 1994)

This owl is a secondary cavity nester in this part of its range and relies on cavities built by hairy woodpeckers, northern flickers, and sapsuckers. A review of the literature suggests preferred habitat for the boreal owl on the Forest is mature to old growth Douglas-fir, mixed conifer, spruce-fir, and aspen forests. In Idaho, nesting occurs in mid-April to late May.

Mature forests are needed for nesting, because the owls require large nesting cavities (three-inch diameter openings and twelve- to fifteen-inch diameter trees). Nesting habitat structure consists of forests with a relatively high density of large trees, open understory, and multi-layered canopy.

Boreal owls prey primarily on small mammals. Red-backed voles make up the largest proportion of their diet. They are, however, opportunistic and eat insects, birds, pocket gophers, and shrews. Boreal owls are closely associated with high elevation spruce-fir forests due to their dependence on this forest type for foraging year-round.

Population trend data is not available for this species. Wisdom, *et al,* (2002) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin. In the Intermountain Region, boreal owls may occur as island populations (USFS, 1991). They exhibit low density and low rates of population growth. Summer home ranges average about 2,900 acres, and winter home ranges average about 3,600 acres. The largest size nest stands recorded in the literature are thirty acres.

The boreal owl is considered a year-round resident on the Forest. Surveys have been completed in a few areas of the Forest (Caribou-Targhee National Forest Monitoring and Evaluation Reports, 1997-1999 and 2000-2001). Boreal owls were detected in McPherson Canyon in October 1993 and Smoky Canyon in May 1999. The CDC reports four observation records from the vicinity of the Forest.

Flammulated Owl

Flammulated owls are found in mixed pine forests, from pine mixed with oak and pinyon at lower elevations to pine mixed with spruce and fir at higher elevations. They also have been found in aspen and second growth ponderosa pine; however, they prefer mature ponderosa pine/Douglas-fir forests and mixed conifer forests with open canopies. A review of the literature suggests that preferred breeding habitat on the Forest is mature to old growth Douglas-fir. Interestingly, however, the documented nests on the forest were found in aspen.

This owl is a secondary cavity nester, relying on nest cavities built by hairy woodpeckers, northern flickers, and sapsuckers in this part of its range. Dead trees with cavities having nest holes with a 2.75-inch entrance hole diameter are important nest sites. The owls avoid foraging in young dense stands where hunting is difficult. Flammulated owls are almost exclusively insectivorous, preying on small to medium sized moths, beetles, caterpillars, and crickets.

Population trend data is not available for this species. Wisdom, *et al,* (2002) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin. Flammulated owls have been documented in three subsections on the Targhee National Forest, including one in the Palisades area, north of the Caribou National Forest (Caribou-Targhee National Forest Monitoring and Evaluation reports, 1997-1999 and 2000-2001).

Flammulated owls are known to be present in the summer on the Forest and are expected to migrate south for the winter. They have been documented at Clark Mine on Worm Creek (nesting in dead aspen) in July 1993, Left Fork Fish Haven Canyon in August 1992 (dead in water trough), Smoky Canyon in May 1999, head of East Fork Mink Creek in July 1989, and Porcelain Pot Gulch (Bannock Range) in July 1989. The CDC reports ten observation records in the vicinity of the Forest.

Great Gray Owl

In the Intermountain Region great grays occur primarily in the lodgepole pine/ Douglas-fir/aspen zone and in ponderosa pine. They do not build nests but use existing platforms, such as old stick nests built by northern goshawks or red-tailed hawks. They also may nest on platforms formed by dwarf mistletoe brooms, on the flat top of a broken tree, or on artificial platforms. In Idaho, they are found at lower elevations and agricultural areas in winter and in coniferous forest in summer, most commonly near meadows or openings.

Great Gray owls prey primarily on voles and pocket gophers throughout the year. They use mixed coniferous and hardwood forests usually bordering small openings or meadows. They forage along edges of clearings. Semi-open areas near dense coniferous forests where small rodents are abundant are optimum roosting and nesting areas. In Idaho, owls nesting near clearcuts were found to have greater proportions of pocket gophers in their diet. They hunt from a perch and capture food on the ground.

Population trend data is not available for this species. Wisdom, *et al,* (2002) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin.

On the Targhee National Forest, however, great gray owls are widely distributed and have been observed in all of the seven ecological subsections (Caribou-Targhee National Forest Monitoring and Evaluation reports, 1997-1999 and 2000-2001).

The Great Gray owl is a year-round resident on the Forest. They have been documented in the Bannock, Webster, Bear River, and Grays Ranges.

TRUMPETER SWAN

From 1988 to 1992 trumpeter swans were trans-located from areas to the north into areas adjacent to the Forest, such as Bear River, Fort Hall, and Grays Lake. No observations have been reported of swans on the Forest.

HARLEQUIN DUCK

The only area identified on the Forest as potentially providing habitat for harlequin ducks is McCoy Creek, which is immediately south of Palisades Reservoir. McCoy Creek Road follows McCoy Creek fairly closely. A few sections stream are considered potentially suitable, because of the security provided by the distance from the road, heavy vegetative cover, or topographic cover.

NORTHERN GOSHAWK (REYNOLDS, *ET AL*, 1992)

The northern goshawk is a forest habitat generalist that uses a variety of forest types, forest ages, structural conditions, and successional stages. It preys on small to medium-sized birds and mammals it captures on the ground, in trees, or in the air. Forests within goshawk nesting home ranges should be an interspersed mosaic of structural stages to increase the diversity of habitat for goshawks and their many prey species.

Population trend data is not available for this species. Wisdom, *et al,* (2002) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin.

Patla (1997) studied goshawks on the Targhee National Forest to the north. She found nest stands in Douglas-fir, mixed conifer, and lodgepole pine cover types. More than half had some degree of past timber harvest in the area. The six most important prey categories she found were snowshoe hare, Uinta ground squirrel, ruffed grouse, blue grouse, unidentified grouse species, and red squirrel.

The Caribou-Targhee Monitoring and Evaluation Report (2000-2001) summarized data from goshawk nest territory monitoring. Nest occupancy rates were down in 1998, 1999, and 2000 compared to the early 1990s. Patla (2000) believes this trend is due to a variety of factors, including possible cyclic populations, weather patterns, monitoring methods, and management.

Nest Areas

Nest areas include one or more forest stands, several nests, and several landform characteristics. Nest areas are occupied by breeding goshawks from early March until late September and are the focus of all movements and activities associated with nesting. The size (twenty to twenty-five acres) and shape of nest areas depend on topography and the availability of patches of dense, large trees.

Nest areas are often used more than one year, and some are used intermittently for decades. Many pairs of goshawks have two to four alternate nest areas within their home range. All previously occupied nest areas may be critical for maintaining nesting populations, because they contain the habitat elements that attracted the goshawks originally. Additionally, replacement nest areas are required, because goshawk nest stands are subject to loss from catastrophic events and natural decline.

Goshawk nest stands have a relatively high tree canopy cover, a high density of large trees, and are usually classified as mature or older forested stands. Studies suggest that the dense vegetation in these stands provides relatively mild and stable microclimates, as well as protection from predators.

Nest trees surveyed by Patla (1997) were largely in Douglas-fir, with minor amounts in lodgepole pine, aspen, and spruce. Douglas-fir trees tend to have stout, lateral branches that provide good structural support for nests. Most of the nests were found on mid- to lower slope positions. The average size of the nest area was 80 hectares. Mature conifer with a large range between stands was the dominant cover type with smaller amounts of young sawtimber, seedling stands, sage/shrub, and open areas.

Within the forty-one known nesting territories on the Forest, a wide range of forest cover exists within the 200-acre nest area. In addition, five nest areas were located in areas with fifty percent grass/shrub cover types, four nest areas in areas with fifty percent maple cover, and one with more than seventy-five percent rock present. Overall, approximately three-quarters of the nest areas had more than seventy-six percent forested cover.

Table 3. 60 Goshawk Nesting Area Vegetation Cover.

	0 to 25% Forest Cover	26 to 50% Forest Cover	51 to 75% Forest Cover	76 to 100% Forest Cover
Number of 200-acres nest areas	3	5	3	30
Percent of total nest areas	7	12	7	73

Post-fledging Family Area (PFA)

A PFA includes the area used by the adults and young from the time the young leave the nest until they are no longer dependent on the adults for food. The PFA surrounds the nest area, and although it generally includes a variety of forest conditions, the vegetation structure resembles that found within nest stands. PFAs vary in size from 300-600 acres. PFAs

provide the young hawks with cover from predators and sufficient prey to develop hunting skills and feed themselves in the weeks before juvenile dispersal. Forest vegetation in the PFA should contain understories with a canopy cover greater than fifty percent and well-developed understories and habitat attributes critical in the life histories of goshawk prey species.

Patla (1997) found that the PFAs (160 ha) also had a large range of mature forests present, but only two territories (7 percent) had PFAs with less than forty percent mature forest cover.

Foraging Area

Goshawks prey on birds and mammals in the larger body-size class available to forest dwelling hawks. Generally speaking, because larger species of vertebrates have less dense populations than smaller species, predators of large prey must hunt over large areas in order to meet their energy requirements. Goshawk foraging areas are about 5,000 to 6,000 acres.

Limited studies suggest that goshawks prefer mature forests for foraging. Additional information on the composition and structure of goshawk foraging habitat was gleaned from information on the habitat requirements of goshawk prey species. Raptor populations are often limited by prey populations, and choice of foraging habitat is somewhat restricted by prey abundance and accessibility.

The foraging area comprises the largest portion of the goshawk nesting home range and typically includes a greater diversity of landforms, forest cover types, and vegetation structural stages. Important habitat components include snags, downed logs, woody debris, openings, large trees, herbaceous and shrubby understories, and interspersion of vegetation structural/successional stages.

Use on the Forest

Goshawk monitoring on the Forest identified forty-six goshawk territories; some of these are historic, and some are active. Not all of the Forest has been inventoried or monitored for goshawks; therefore, additional territories are sure to exist. Goshawks also have been found on adjacent lands on the Targhee National Forest to the north and the Bridger-Teton National Forest to the east. The following table displays an overview of the number of known nest territories on the Forest.

Table 3. 61. Goshawk Nest Territories on the Caribou National Forest.

Ranger District	Number of Known Territories
Soda Springs	6
Montpelier	32
Westside	8

THREE-TOED WOODPECKER (CLARK, *ET AL*, 1989)

Three-toed woodpeckers are found in northern coniferous and mixed forest types up to 9,000 feet elevation. Their distribution is roughly the same as the distribution of spruce. They use forests of spruce, ponderosa pine, and lodgepole pine. Nests are found in spruce, pine, and aspen trees, where they excavate cavities in standing trees or snags. Nests are also found in willow riparian, high elevation aspen groves, in swamps, and burned over coniferous forests.

Both live and dead trees are used for foraging substrate. They forage by scaling, which involves prying off layers of bark by probe-tapping to get insects beneath the bark. About seventy-five percent of their diet is wood boring insect larvae, mostly beetles, but they also eat moth larvae, spiders, berries and cambium. They are major predators of the spruce bark beetle, especially during epidemics.

Population trend data is not available for this species. Wisdom, *et al,* (2002) predicted that population trends are increasing due to changes in habitat across the Interior Columbia Basin.

Three-toed woodpeckers were documented in the Grays Range at Gravel Creek Campground and in the Webster Range along Manning Creek in1996. Groves, *et al,* (1997) shows the Bear River Range as potential habitat.

While concentrated areas of beetle-infestations vary in space and time, current stand ages favor endemic levels of insects across large areas. As a result, foraging habitat is spread over larger areas. From 1999 through 2001, bark beetles killed 26,486 trees on 5,749 acres of the Caribou National Forest (Hoffman and Mocettini, 2002, e-mail). In the future, epidemic levels of insects and stand-replacing fires will provide concentrated foraging habitats.

COLUMBIAN SHARP-TAILED GROUSE

Over the last decade concern has increased regarding sharp-tailed grouse populations in Idaho, the western United States, and southern Canada. The species has undergone significant range-wide declines and now occupies less than ten percent of its former range. The loss and/or degradation of native grassland and shrubsteppe habitats due to agricultural expansion, fire, invasion of non-native annual vegetation, and overgrazing by livestock are cited as contributing to this decline (Ulliman, *et al*, 1998).

Idaho has the best remaining populations, with 75 percent of the remaining birds (Page and Ritter, 1999). Populations in Idaho are currently increasing, in part due to the Conservation Reserve Program (CRP). In southeastern Idaho, the largest concentration of sharp-tailed grouse is in Fremont, Bonneville, and Oneida Counties (Ulliman, 1995). Birds from the area around the Curlew National Grassland have been transplanted in other areas of Idaho and out-of-state.

Sharp-tailed grouse are habitat generalists and can adapt to many different habitats (Apa, 1998). Summer and brood-rearing habitat generally consists of shrub-steppe vegetation with 20 to 40 percent shrub cover interspersed with a high diversity of forb and bunchgrasses, generally comprised of 60 to 80 percent grass/forb cover. Summer habitat use generally

consists of grasslands or habitat edges during the morning hours, moving to shrub cover during mid-day, then back to more open vegetation types toward the evening (Ulliman, 1995).

During winter, sharp-tailed grouse exhibit a close association with deciduous trees and mountain shrubs in upland and riparian areas, because they provide the only adequate food source and shelter from weather and predators. Habitat use is influenced by the severity of the winter. Birds do not move out of summer/fall habitat unless forced by heavy snows (Ulliman, 1993).

Sharp-tailed grouse favor lek (traditional breeding grounds) locations with low, mottled, or sparse vegetation and good visibility. Leks tend to be used year after year and are focal points in population surveys and monitoring. In the fall a hunting season for sharp-tailed grouse occurs in southeast and eastern Idaho. Apa (1998) found that females moved about 1,400 meters (or about one mile) from lek of capture to nest location.

Survey data for lek attendance on leks adjacent to the Forest is inconsistent and limited. For example, in 1986, two leks were surveyed; in 1992 seventeen leks were surveyed; and in 1998 seven leks were monitored. Approximately forty-nine leks are known to be within two miles of the Forest, but none have long-term data. About twenty-two of these leks are within one mile of the Forest. Because of the limited data, no analysis will be made regarding population trends in the vicinity of the Forest.

SPOTTED FROG

To date, amphibian surveys on the Forest have found four species but no spotted frogs (Burton and Peterson, 1998). According to Peterson (pers. comm.) this species is not found in southeast Idaho. A segment of the Great Basin population is found in the southwest part of the state. A segment of the Yellowstone population is found to the north of the Forest. This species will not be analyzed further in this EIS.

MANAGEMENT INDICATOR SPECIES (MIS)

The 1985 Forest Plan identified seven terrestrial species of animals as management indicator species (MIS). These MIS were chosen because of general, wide public interest, or because the species has habitat requirements similar to other species for which it can serve as a biological barometer for the well being of specific habitats.

In 1997, Forest Service Region's 1 and 4 developed and approved protocols for identifying terrestrial MIS species for forest plan revisions. A good indicator species is one that is sensitive to the underlying habitat of interest and is specific to the habitat of interest. Several MIS were identified for specific habitats.

The protocol process used for this Plan revision included a review of existing MIS and a determination of whether these species were adequate to retain as an MIS. Habitats were

identified for MIS monitoring. Habitat identification generally included habitat areas that are considered at high risk, through the Forest's Vegetation Properly Functioning Condition assessment, the Idaho Bird Conservation Plan, or the Columbia River Basin Assessment. Where appropriate species could be found for these priority habitats, MIS were selected. In several cases, no wildlife species met the selection criteria, or population trend data could not be realistically gathered. (See MIS section in the Wildlife section of Appendix D for more information.)

Table 3. 62. Habitats at Risk and Suggested MIS

Habitat	Species	Rationale
Grassland and open canopy sagebrush	Columbian sharp-tailed grouse,	Only one of the SAR that is a year-long resident, and some monitoring data is available through State agencies. This grouse is also a Sensitive Species.
Sagebrush	Sage grouse	Currently a MIS for the Caribou NF and was identified as a MIS for Region 1. Some monitoring data exists through State agencies, i.e. Fish & Game.
Mature and old forest structure	Goshawk	Currently the Goshawk is a Sensitive Species and monitoring data exists. Goshawks have large home ranges, use a variety of forest types and structural stages within their foraging areas, but nest in older stands.

Northern Goshawk and Columbian sharp-tailed grouse have been discussed previously as Sensitive Species. Information on sage grouse follows. More information on habitat for sage grouse is found in the Sage Grouse section of Chapter 4 and in the Wildlife section of Appendix D.

SAGE GROUSE

Sage grouse depend primarily on sagebrush habitat for much of the year, although meadows and mesic sites are seasonally important habitat components (Connelly, *et al*, 1988). Sage grouse prefer sagebrush habitats year round; however, other shrubs within the sagebrush community may be used (Braun, *et al*, 1977). During the winter months, sage grouse rely almost exclusively on sagebrush with a relatively dense canopy for food and cover. Sagebrush provides nesting habitat in the spring; other shrubs in the community may be used, but nest success is reduced. Sage grouse have higher nesting success and lower predation rates in sagebrush communities with a dense canopy and tall grasses (DeLong, *et al*, 1995).

Sage grouse are solely dependent on sagebrush for food from fall to spring. During spring, the diet shifts to forbs. Forbs and insects are a fundamental part of the diet of sage grouse chicks. During the early part of a chick's life, insects (beetles and ants) dominate the diet. After this time, forbs become the most important food. In addition, forbs provide essential nutrients for pre-laying sage grouse hens, which may ultimately affect their reproductive success. Sage grouse hens consume fewer forbs and more shrubs as forbs begin to dry out.

Sage grouse populations appear to be declining across much of their range; they are extirpated in seven states where they previously were known. Idaho was expected to have less than 20,000 sage grouse in the spring of 1998 (Braun, 1998). Braun suggests that no

single factor is responsible, but habitat loss, habitat fragmentation, habitat degradation, weather, predation, and hunting have all contributed to the decline.

Two known leks are within two miles of the Forest boundary and have long-term monitoring data: Geneva and Slug 1. In addition, two other larger leks are within five miles and also have long-term monitoring data: Wooley and Trail. The data suggest a declining population trend for sage grouse on these four leks (See Wildlife section in Appendix D for more information). It is interesting to note that only four leks were reported and monitored prior to 1977, while in 2000 fourteen leks were monitored. Because of the difference in survey intensity, it is difficult to get a clear picture of overall trends. On the fourteen leks surveyed in 2000, only three are larger leks (over twenty males).

Patch sizes/treatment sizes are provided in the new sage grouse guidelines. Vegetation types are very patchy across the Forest and are generally found in a mosaic of small patches. To get an overall picture of actual patch size, a patch size analysis was completed. Six relatively undisturbed watersheds were selected. Initially, three broad vegetation types (sagebrush, aspen, and conifer) were selected. Two of the six watersheds were selected where a good representation of one of the three vegetation types was evident.

Table 3. 63 Average Patch Size of Sagebrush Stands in Selected Watersheds.

Watershed Patch Areas	Average Sagebrush Patch Size
Preuss	229 acres
Weston	95 acres
Toponce	35 acres
Rock/Pine	294 acres
St. Charles	56 acres
Horse	94 acres

Naturally, patch sizes vary widely. A few areas on the Forest support larger patches, while the rest of the Forest contains smaller patches. Sagebrush vegetation is very patchy on the Forest. Because most of the sagebrush habitats are at lower elevations on and off the Forest and are mixed with other types as elevation increases, they naturally are more broken on the Forest. To get an idea of patch sizes in sagebrush stands, six relatively undisturbed watersheds were selected from across the Forest. The average sagebrush patch size in these six watersheds ranged from 35 acres up to 294 acres.

Table 3. 64 Average Sagebrush Patch Size in Selected Watersheds.

Watershed Patch Areas	Average Sagebrush Patch Size
Preuss	229 acres
Weston	95 acres
Toponce	35 acres
Rock/Pine	294 acres
St. Charles	56 acres
Horse	94 acres

SPECIES-AT-RISK

Species-at-Risk are those species for which a loss of viability, including reduction in distribution or abundance, is of concern within the planning area. This includes Threatened, Endangered and Sensitive Species (which have been discussed previously). Additional species-at-risk for this analysis include species from the Region 4 Species-at-Risk data table (McCarthy, USFS), as well as the incorporation of species from other analyses. Species of concern from the Idaho Conservation Data Center (CDC), the Interior Columbia Basin Assessment (USDA-FS/USDI-BLM, 1996), and the Idaho Bird Conservation Plan (Partners in Flight, 2000) have been incorporated where appropriate. These species are listed by habitat association (forest, rangelands, and riparian) in the following sections. For more information on how these species were selected and how they were grouped, see the Wildlife section in Appendix D. Four of the species-at-risk were identified as needing an individual assessment; these species include the marten, northern leopard frog, boreal toad and pygmy rabbit.

TERRESTRIAL WILDLIFE SPECIES AND HABITATS IN FORESTLANDS

Forest communities and their seral stages (grass/forbs, shrub/seedling, pole/sapling, young, mature, over-mature/old growth) have unique environmental conditions that are ecologically important as niches for wildlife species (Thomas, 1979). The niches are products of plant communities, successional stages, and other environmental factors, including soil type, moisture regime, microclimate, slope, aspect, geology, elevation, and temperature.

FOREST COVER TYPES

Five different forest cover types are found on the Forest (limber pine, Engelmann spruce/subalpine fir, aspen, lodgepole pine and Douglas-fir), each occupying different soil types, elevations, aspects, and moisture regimes. These cover types provide a mix of structural stages and associated vegetation for 186 (fifty-six percent) wildlife species on the Forest that are either directly dependent on forested communities or use forested habitats during their annual life cycle. (USFS-WILDRAM, n.d.) Of the 247 avian species known/suspected to occur on the Forest, 130 (fifty-three percent) are associated with forested cover types; (WILDRAM, n.d.) seventy-five percent of the neotropical migratory land birds[39] using the Forest are dependent upon or associated with forested cover types (USFS, 1991). Social and economically important species, such as mule deer, elk, and moose commonly occur in forested habitats (USDA-FS, 1985).

39 **Neotropical** migratory land birds are bird species that migrate to those parts of the new world that lie south of central Mexico and Cuba and north of northern Argentina and southern Brazil.

In 1985, the Forest Plan identified the majority (more than ninety percent) of conifer stands to be in mature (sawtimber) and over-mature (old growth) age classes (USDA-FS, 1985). While timber harvest, and to a lesser degree wildfire, have converted some mature and over-mature conifer into early seral stages, the majority of conifer communities remain skewed to the late seral stages (USDA-FS, 1997). In 1997-98, the Forest completed an analysis of old growth conifer occurrence using a random sample of conifer stands (plots) from a 1993 forest-wide inventory. The analysis used revised old growth definitions (Hamilton, 1993) and employed a process used by the Targhee National Forest (USDA-FS, Process Paper D, n.d.). (See Issue 3, Ecosystem Management, for more information.)

The 1985 Forest Plan identified twenty-four percent of the conifer component of the Forest as old growth (USDA-FS, 1985) in contrast to fourteen percent using the Targhee National Forest process criteria (categories A-C, excluding aspen dominant stands). One reason for the decrease in the amount of old growth between the 1985 Forest Plan and the 1993 definitions is the more stringent quantitative criteria applied in the 1993 old growth definitions (such as greater diameter at breast height (dbh), number of tree canopy layers, number of standing and down dead trees) when compared with the 1985 criteria. When incorporating category D, which requires only that live trees meet minimum dbh requirements, an additional seventy percent of the conifer component can be classified as late seral. Based on 1993 old growth definitions and the analysis process identified above, approximately eighty-four percent of the conifer component on the Forest exhibits at least some late-seral structural attributes.

The analysis described above validates the Forest's Subregional Properly Functioning Condition (PFC) Assessment completed by an interdisciplinary team in 1997(USDA-FS, 1997). The assessment concluded the limber pine, subalpine fir/Engelmann spruce and Douglas-fir community late seral age distributions are exceeding those considered to be within properly functioning condition. With the exception of limber pine, these conifer types are considered to be "at risk" to stand replacement fires and/or insect and disease infestations. The lodgepole pine seral classes are considered to be somewhat balanced, but the mid-seral stages were estimated to comprise less than ten percent of this type. The above conditions are similar to that identified in the *Scientific Assessment for Ecosystem Management in the Interior Columbia Basin* (USDA-FS, USDI-BLM, 1996).

Conifer habitats currently favor late succession associated wildlife species, such as marten and lynx, which use late seral forests for travel, denning, and to a degree, foraging. However, late successional forest structure does not provide habitat for early successional prey species such as snowshoe hares. With the exception of a limited number of socially or economically important wildlife species, little is known regarding current populations of most forest dwelling species on the Forest. One forest environment "generalist," Rocky Mountain elk, have increased from an estimated forest-wide population of 1,750 in the early-mid 1980's (USDA-FS, 1985) to slightly over 8,000 in the Bear River and Diamond Creek management zones on the eastern half of the Forest (Idaho, 1998).

Seven of the thirteen sensitive terrestrial species known or suspected to occur on the Forest are associated with conifer and aspen habitats. Sixteen of the fifty-seven coarse-filter Species-at-Risk are associated with forest types as shown below.

Table 3. 65. Forest-associated Species-at-Risk

Low-elevation Mixed Conifer	High-elevation Mixed Conifer	Aspen
Sharp-shinned hawk	Uinta chipmunk	Ruffed grouse
Northern pygmy owl	Olive-sided flycatcher	Red-naped sapsucker
Lewis' woodpecker	Hammond's flycatcher	
Williamson's sapsucker	Northern flying squirrel	
Brown creeper	Marten	
Western tanager		
Silver-haired bat		
Long-legged bat		
Long-eared bat		

Marten

Marten distribution is closely associated with late-successional coniferous forests. Voles are the most important food item across the range. Marten prefer cool, moist forests with high structural diversity in the understory.

Population trend data is not available for this species. Wisdom, *et al,* (2000) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin.

In the winters of 1994 and 1995, Forest biologists, in cooperation with the Idaho Department of Fish and Game, released pine marten back into the Bear River Range to supplement the remaining resident populations. During the winters of 1995 and 1996 camera bait stations recorded the presence of pine marten in the Bear River range.

Structure, Composition, and Wildlife Habitat in Aspen Communities

It is estimated that aspen once occupied up to 425,000 acres (172,000 ha) of the Forest in the late 1800s. The majority of the historic acres were seral stands of aspen that persisted due to disturbance, primarily wildfire (USDA-FS, 1997). Today, aspen occupies an estimated 320,000 acres (129,500 ha) of the Forest, a decline of 100,000 acres (40,470 ha), or a twenty-five percent decline from historical estimates. Historic overgrazing probably caused the decline in aspen habitats, which directly reduced aspen regeneration and accelerated conifer establishment. Grazing also removed the fine fuels needed to maintain fire intervals that suppressed conifer encroachment (USDA-FS, 1997). Extended fire intervals and fire suppression have resulted in the establishment of conifers in significant acreages of aspen. (See also, Issue 3, Ecosystem Management, Forested Vegetation.)

The Forest completed an analysis of aspen old growth using data and methodologies described in the conifer discussion above. Of the aspen plots analyzed, about eighteen

percent met or partially met old growth criteria as defined by the Intermountain Region (Hamilton, 1993). When including those plots that have live trees that meet minimum diameter at breast height (dbh) old growth characteristics, thirty-four percent of the aspen plots sampled exhibit at least some late-seral status structural attributes. The 1985 Forest Plan did not attempt to quantify the amount of old growth aspen on the Forest.

The above analysis validates the Subregional Properly Functioning Condition (PFC) Assessment for the Forest described earlier in this chapter. The Subregional PFC Assessment estimates that fifty percent of the aspen on the Forest is mature to old, twenty percent is young, and thirty percent is in seedling-sapling condition. Also, many aspen areas are experiencing the establishment of conifer, further reducing the extent of aspen on the Forest.

Aspen is the most productive forest community type on the Forest in terms of wildlife diversity and herbaceous composition. Aspen provides calving/fawning areas for big game, browse for small and large mammals, nest sites for ground and arboreal bird species, security areas, loafing sites, and foraging areas for a variety of wildlife species. While the existing age and structural mix of aspen is considered to be better balanced than the conifer, a need exists to revert some late successional conifer with an aspen component to early successional status to move towards a properly functioning condition to meet wildlife habitat needs into the future.

While maintaining a portion of the aspen community as an aspen-conifer mix is desirable, it is necessary to treat aspen stands where conifer is becoming established to provide an array of seral stages for those wildlife species which depend on the patterns and structure historically found in properly functioning aspen woodlands. Without reversing the trend in the loss of aspen to conifer, biological diversity at the landscape scale will continue to decline.

TERRESTRIAL WILDLIFE SPECIES AND RANGELAND HABITATS

RANGELAND COVER TYPES

Six different rangeland cover types occur on the Forest: juniper, mountain mahogany, tall forb, mountain brush, and sagebrush. All are typically associated with lower elevation and lower precipitation regimes compared with forested cover types. Of the 334 avian, terrestrial, and amphibian species known or suspected to occur on the Forest, 170 (fifty-one percent) are either directly dependent or associated with rangeland habitats (WILDRAM, n.d.). Of the 247 avian species known/suspected to occur on the Forest, 100 (forty percent) are associated with rangeland habitats (WILDRAM, n.d.); forty-seven percent of the neotropical migratory land birds on the Forest are dependent upon or associated with these habitats (USDA-FS, 1991). Rangeland dependent species such as sage grouse (a sagebrush obligate[40]) increasingly depend on habitats provided on the Forest and other public lands, due to declining acres of private land habitat lost to agriculture and development. The Forest

40 **Sagebrush obligate** is a plant or animal that occurs in a narrowly defined habitat, in this case, sagebrush.

provides a portion of the big game winter range for herds summering on the Forest (USDA-FS, 1985).

Rangeland communities provide a wide array of habitats for wildlife species found on the Forest. Rangelands are often thought of in the context of winter range for big game species. However, a variety of less conspicuous wildlife species are found in the rangeland cover types including native grouse (sage and Columbian sharp-tailed), raptors, and migratory birds such as the rufous-sided towhee and chipping sparrow.

Mountain brush habitats in some areas are declining due to advancing late seral composition and the establishment of juniper. Continued decline of mountain brush habitats will reduce carrying capacity of big game winter range, as well as nesting habitat for avian species. Other rangeland cover types, such as mountain mahogany and sagebrush, are trending towards old structural conditions, resulting in reduced understory production. While a degree of cover and forage is provided by older age classes of mountain mahogany and sagebrush, and is required by some species, treatments are needed to provide a better balance of early and mid seral stages of these types to meet wildlife needs in the future (USDA-FS, 1997).

These findings also correspond with the findings from the ***Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*** that found widespread declines have occurred in these types. Partners in Flight also concluded that sagebrush shrublands were a high priority habitat for conservation. (See Issue 3, Ecosystem Management, Non-Forested Vegetation for more information.)

Six (thirty-one percent) of the nineteen Sensitive Species known or suspected to occur on the Forest are associated with rangeland habitats. Twenty-three of the fifty-seven coarse-filter Species-at-Risk are associated with rangeland types as shown in the following table.

Table 3. 66. Rangeland-associated Species-at-Risk

Grassland/ Open Canopy Sagebrush	Sagebrush/ Closed Canopy Sagebrush	Juniper/Pinyon/ Mountain Mahogany	Arid Cover Types
Columbian sharp-tailed grouse	Sage sparrow	Ferruginous hawk	Western small-footed myotis
Long-billed curlew	Sage grouse	Gray flycatcher	Pallid bat
Grasshopper sparrow	Pygmy rabbit	Plumbeous vireo	
Swainson's hawk	Sage thrasher	Western scrub jay	
Western meadowlark	Brewers sparrow	Pinyon jay	
Loggerhead shrike		Virginia's warbler	
Short-eared owl		Black-throated gray warbler	
Burrowing owl			
Lark sparrow			

Pygmy Rabbit

This species uses dense stands of tall sagebrush with a high amount of woody cover in areas with deep soils. Sagebrush is the primary food, but grasses and forbs are eaten in mid to late summer.

Population trend data is not available for this species. Wisdom, *et al,* (2000) predicts that population trends are declining due to changes in habitat across the Interior Columbia Basin.

Documented historic records for pygmy rabbits are from the Pocatello vicinity in the lower elevations below the Forest boundary near Fort Hall and Downey, Idaho. No known occurrences have been documented on the Forest. In the past, pygmy rabbits have been included in the hunting season for cottontail rabbit. Because of the unknown population status of this species, the Idaho Department of Fish & Game may remove pygmy rabbits from the upcoming hunting season (IDF&G, pers. comm., 2002).

RIPARIAN WILDLIFE SPECIES AND HABITATS

RIPARIAN HABITAT AREAS

Riparian communities provide a wide array of habitats for wildlife found on the Forest. Of the 334 avian, terrestrial, and amphibian species known or suspected to occur on the Forest, 277 (eighty-three percent) are either directly dependent on riparian areas or use riparian habitats during their lives. Management activities in riparian habitats may have either a beneficial, detrimental, or neutral effect on wildlife species that occur in those habitats. With the majority of species found on the Forest dependent or associated with riparian areas, issues of riparian structure, function, and condition directly influence the relative condition of the wildlife component and overall ecosystem. Generally speaking, properly functioning riparian areas and wetlands will provide the habitat necessary to support the wide array and variety of riparian and wetland associated species found on the Forest. (See Issue 6, Riparian and Aquatic Biota for more information.)

Wildlife use riparian areas disproportionately more than any other type of habitat (Thomas, 1979). Riparian areas provide water, and typically two other critical elements of habitat: food and cover. The greater availability of water to plants, in combination with deeper soils, increases plant biomass. These factors lead to increased diversity of plant species and structural diversity (cover) in the community. Riparian areas dominated by deciduous vegetation provide one type of habitat in summer when in full leaf and a different type of habitat during the winter following leaf fall. Riparian areas produce more edges[41] within a small area than would be expected.

In addition, shrub and tree riparian areas exhibit structural diversity. This structural layering of vegetation and contrasting form provide diverse nesting and feeding opportunities for

41 **Edges** are places where plant communities meet or where successional stages of vegetative conditions within plant communities come together.

wildlife, especially birds and bats. Riparian areas provide migration routes for wildlife such as birds, bats, deer, and elk and may serve as connectors between forested habitats. Wildlife may use riparian areas for cover while traveling across otherwise non-forested areas. Some species, such as small mammals and amphibians, use such routes in dispersal from their original habitats to connected suitable habitats under circumstances, such as competition or loss/modification of suitable habitats.

Of the seven species of amphibians suspected to occur on the Forest, four (tiger salamander, western toad, leopard frog, and boreal chorus frog) have actually been documented. Five systematic surveys for amphibians have been completed on four geographic areas of the Forest: the Mink Creek and the Toponce areas on the Westside Ranger District (Burton and Peterson, 1998); the Tincup Creek and Dry Valley areas on the Soda Springs Ranger District (Burton and Peterson, 1998); and the Montpelier Creek area on the Montpelier Ranger District (Burton and Blackwelder, 1997). Where historical records exist for the Forest, data suggest local declines in several species, notably the leopard frog and western toad. This trend mirrors observed declines of populations of these two species in many portions of the Rocky Mountain region (Corn, 1994).

Other amphibian species appear to be relatively abundant where surveys have been completed. Of note is the occurrence of the largest known population of western toads in eastern Idaho, found in the Tincup Creek area. Amphibian habitat modeling completed by Burton and Peterson in 1998 suggested different habitat characteristics are selected by amphibian species for breeding and larval development. These riparian/wetland sites range from sites nearly devoid of vegetation to sites rich with herbaceous and shrub vegetation.

The importance of riparian areas for birds is evident by the number of species associated with this unique habitat; of the 247 avian species known/suspected to occur on the Forest, 211, or eighty-five percent, are associated with riparian habitats (WILDRAM, n.d.). Of the 108 neotropical landbird species known/suspected to occur on the Forest, 101 (ninety-three percent) are associated with riparian habitats (USDA-FS, 1991). Some species of neotropical birds are believed to be in decline. While several factors may be contributing to the downward trend in some species, maintenance of functioning riparian habitats plays an important role in the conservation of these wide-ranging migrants.

Birds that occur in riparian areas select a variety of habitat structural stages. Some species of birds will select the canopy of thick, dense shrubs found along riparian areas for nesting and rearing of young, while other species will select mid-story and understory vegetation layers for nesting and rearing (USDI-BLM, n.d.). No riparian breeding bird surveys have been completed on the Forest, and relatively little is known about the condition of riparian vegetation to riparian obligate and dependent avian species.

Eighteen of the fifty-seven coarse-filter Species-at-Risk are associated with riparian and wetland types as shown in the following table.

Table 3. 67. Riparian-associated Species-at-Risk.

Riparian	Non-riverine wetlands
Northern leopard frog	Cinnamon teal
Western (boreal) toad	Redhead
Common garter snake	Sandhill crane
Lesser goldfinch	Killdeer
MacGillivrays warbler	Black-necked stilt
Black-chinned hummingbird	American avocet
Calliope hummingbird	
Rufous hummingbird	
Willow flycatcher	
Dusky flycatcher	
Yellow warbler	
American dipper	

Northern Leopard Frog

In Idaho the leopard frog lives in marshes and wet meadows from low valleys to mountain ridges (IDFG, 1994). C. Peterson (pers. comm.) found that this species is often associated with beaver ponds. The species eats vertebrates, as well as invertebrates. It winters in the bottom of ponds and lakes.

The northern leopard frog is ranked as being globally secure but rare or uncommon in Idaho (CDC, 2002). The species was historically found on the Pocatello Ranger District. In 1996 and 1997 surveys were conducted in the Scout Mountain and Clifton Creek areas. No observations were recorded of the species in this area; however, records indicate one occurrence was recorded in Toponce Creek, and the species appeared to be locally abundant (Burton and Peterson, 1998). Burton and Peterson concluded that the Toponce Creek drainage is an important area for this species.

Boreal Toad

Although generally found near water, these toads inhabit a variety of habitats – from sagebrush dessert to mountain meadows.

The boreal toad is ranked as not rare and apparently secure, both globally and statewide (CDC, 2002). Western (boreal) toads were historically found in several areas of the Forest. In recent surveys they were found in Tincup drainage (Burton and Peterson, 1998). Surveys conducted in 1996 and 1997 documented this species in four of 184 sites. Only one breeding site was found. Burton and Peterson concluded that the Tincup Creek drainage is an important area for this species.

LANDBIRDS

Idaho has 243 species of birds that breed in Idaho (IPIF, 2000). Breeding bird survey routes in Idaho from 1966 to 2000 found 114 species on more than fourteen routes. Of these 114 species, forty-six percent had positive population trends, eighteen percent had significant negative population trends, particularly wetland-associated species, and nine percent had significantly positive trends.

Landbirds have been incorporated into the forest planning process in several areas: through the identification of species-at-risk, development of habitat conservation measures to address the needs of these species-at-risk, and in the standards and guidelines of the Revised Forest Plan.

Big Game

Mule deer and elk were Management Indicator Species (MIS) in the 1985 Forest Plan; however, they do not meet the current criteria and are not considered a MIS in the Forest Plan Revision. Big game species are analyzed because of the economic and public interest associated with them.

Historically, big game have migrated from upper elevation, conifer-dominated habitats to lower elevation rangeland communities to winter, particularly where snow depths are less, vegetation is exposed on wind swept ridges, and the shrub component is available for browsing. Less than thirty percent of the summer mule deer population winters on the Forest; the majority move off-Forest to adjacent federal, state, or private land. With the increase in elk numbers in southeast Idaho over the last decade, elk have "pioneered" new winter ranges both on and adjacent to the Forest. Increasing elk populations are creating concern over competition between wintering mule deer and elk in some areas (Idaho, 1998). The cumulative impacts of domestic livestock and big game foraging have the potential to adversely impact vegetation, range, and watershed conditions in some areas and degrade big game winter range.

Construction of new homes and developments on historic big game winter range is an emerging issue in southeast Idaho. Some areas adjacent to the Forest that were historically occupied by wintering mule deer and elk (such as Mink Creek, Bailey/Eightmile Creeks, and the west slope of Bear Lake) are being converted into housing developments and "ranchettes." These developments are displacing big game from traditional, privately owned winter range. With the direct loss or displacement of big game from portions of their winter ranges, the wildlife habitat value of the remaining winter range on both private and public land increases. As big game densities increase on existing winter range, the potential for conflicts with livestock increase, as well as the potential for resource damage. Given the current trend in rural development and the expected increase in human population densities from 30 to 80 people per square mile in eastern Idaho (Snake headwaters) by the year 2040

(USDA-FS, USDI, BLM, 1996), these issues are likely to intensify into the next planning period.

In 1999, Idaho Department of Fish and Game (IDFG) released their "White-tailed Deer, Mule Deer and Elk Management Plan" (Kuck and Compton, 1999). Their plan established The Department's management objectives for population, buck:doe or bull:cow ratios, and percent mature bucks/bulls in the harvest. These objectives are shown below with the current condition of each. The Forest includes portions of Hunting Units 66, 66a, 70, 71, 73, 75, 76 and 78 (See Map 3.13 for locations).

Summer habitat effectiveness is defined as the percent of available habitat that is usable by elk from late green-up to hunting season (Christensen, *et al*, 1993). Factors that influence summer habitat effectiveness include roads, special features such as wet sites, riparian areas, movement corridors, cover, domestic livestock grazing, and land ownership patterns. Roads have been identified as the most significant consideration on elk summer range.

During hunting season, vulnerability results from a complex relationship between access, cover, topography, hunter density, type of season, and weather. The measure of this factor is the level of compatibility between the Forest Service and State management plans, such as number of bulls per hundred cows (Christensen, *et al*, 1993).

The Forest Plan has identified approximately eighteen percent of the Forest as winter range. These areas were identified based on big game flight information from the Idaho Department of Fish & Game.

Appendix D includes additional information on big game movements, motorized use, hunting seasons, and the potential for competition between elk and mule deer.

MULE DEER

Mule deer are the most abundant and widely distributed big game animal in Idaho. They are primarily browsers, and much of their diet is twigs and leaves of shrubs and trees, especially in the winter. Winter range is a critical component of mule deer habitat. Mule deer are highly susceptible to high mortality during periods of prolonged deep snow and low temperatures.

The condition of a deer at the start of winter depends on the quality of the habitat it occupies during the rest of the year. The main strategy of mule deer is to survive by minimizing energy loss (becoming sedentary and using thermal cover) and by eating enough to prolong fat reserves. Development on private lands and disturbance by humans while on winter range contribute to decreased vigor.

Studies on deer that winter in the Willow Creek drainage to the north of the Forest found very high fidelity to seasonal home ranges. Migration generally followed topographic features, and these routes were used in the spring and fall. Deer preferred closed canopy cover types on summer ranges, open canopy cover types during migration, and closed canopy cover types in early winter (Thomas, 1987). Thomas also found that many of the deer

wintering on Willow Creek migrated south along Fall Creek and summered in the area of the Forest to the north of Tincup Creek (Unit 66a).

Populations have declined since the 1950s and 1960s statewide. Because they are adapted to transitional, seral habitats, and because management activities (prescribed burning) are not occurring at historic levels, populations are not expected to rise to those levels. Generally, annual mortality is due to predation, winterkill, accidents, hunting, weather, and possible competition with elk and disease (Kuck and Compton, 1999). Additions to hunting regulations have included antlerless opportunities designed to stabilize or reduce populations. Recent population declines in part of southern Idaho are a result of severe winters when significant winter mortality occurred. Generally, for mule deer, the buck:doe ratio minimum objective is fifteen bucks per one hundred does (15:100).

Idaho Department of Fish & Game has broken the state into twenty-two analysis areas, which are groupings of hunting units. Each analysis area should have at least one trend area on winter range that will be monitored annually. Analysis Area objectives and data for Trend Areas in each of the Analysis Areas on the Forest are shown in the following tables:

Table 3. 68 Mule Deer Management Objectives and Current Status

Analysis Area	Hunting Unit	Minimum Buck: 100 Doe 1999	Post-harvest Buck: 100 Doe 2000/2001	Minimum Population Objectives 1999	Current Population (April, 2002)
19	66	29 (1997)	21	6,500	2,730
20	70, 73	15	21	2,400	1,555
21	71	15	12	1,700	889
22*	72, 76, 78	15	16	10,000	6,660

*This Analysis Area has five units, but only three trend areas with data: 72, 76, and 78.

During the Forest Planning process, IDFG identified three areas of special concern for mule deer on the Forest. These include: the Malad Range (Unit 73), Southern Bear River Range (Unit 78), and the Portneuf Range (Unit 71). In all three areas, populations are currently below the Idaho Department of Fish and Game management objectives.

Malad Range (Unit 73)

Mule deer numbers in Analysis Area 20 have shown wide changes over short time periods. Hunting seasons have been adjusted to address population structure changes. Despite very conservative hunting seasons and low harvest since 1993, wintering populations of deer in several of the units, including Unit 73, have either remained stable at low levels or declined (Kuck and Compton, 1999).

Lack of early seral habitats and habitats with low productivity and variable winter conditions, road hunting, and motorized access may contribute to the continued low numbers in the Malad Range.

Table 3. 69 Analysis Area 20, Trend Areas Found in the Caribou Vicinity.

Trend Area (Unit 73)	Minimum*	1995	1996	1997	1998	1999	2000	2001	2002
Elkhorn	1,200	761	908	929	787	958	980	1,387	794
Malad Face	1,200	760	962	701	947	942	885	1,622	761

*Minimum antlerless threshold before antlerless harvest is allowed.

PORTNEUF RANGE (UNIT 71)

Mule deer numbers have fluctuated widely in this analysis area, as well. Harvest management was designed to maintain or reduce deer numbers in response to what was considered over-browsed winter ranges. Since the winter of 1992-1993 when significant winter mortality occurred, harvest management has been conservative.

The lack of early seral habitats, as well as habitats of moderate productivity, concentrated recreation activity, structural developments on winter range, open habitats with moderate road densities, and high hunting pressure because of the close proximity of this unit to Pocatello may all contribute to lower numbers.

Table 3. 70 Analysis Area 21, Portneuf Trend Area.

Trend Area	Minimum*	1996	1997	1998	1999	2000	2001	2002
Portneuf	1,700	1,003	978	978	1,097	1,118	920	899

* Minimum antlerless threshold before antlerless harvest is allowed.

SOUTH END OF BEAR RIVER RANGE (UNIT 78)

Mule deer numbers have fluctuated widely in this analysis area. Harvest management was designed to maintain or reduce deer numbers in response to what was considered over-browsed winter ranges. Following the winter of 1992-1993, when significant winter mortality occurred, harvest management has been conservative.

The southern end of the Bear River Range is heavily hunted. Non-resident deer tags sell out in four hours, and resident hunting is limited to bucks only. Although these are productive habitats, the lack of early seral vegetation has reduced browse species. Other problems are associated with the development occurring on the east side of the range by Bear Lake. Mule deer are facing the loss of private land winter range and increased disturbance on publicly managed winter range.

Table 3. 71 Analysis Area 22, Trend Areas Found in the Caribou Vicinity.

Trend Area	Minimum*	1995	1996	1997	1998	1999	2000	2001	2002
West Bear Lake (Unit 78)	3,000	1,884	3,441	2,760	2,548	1,790	1,707	3,105	1,405
Bear Lake Plateau (Unit 76)	3,000	nd	nd	nd	nd	3,427	3,467	5,106	2,378
Soda Hills (Unit 73)	3,000	nd	nd	nd	3,428	1,826	2,378	4,576	2,877

*Minimum antlerless threshold before antlerless harvest is allowed. " nd" means "no data."

The tables above indicate that numbers fluctuate greatly from year to year. While several of the trend areas were above the antlerless threshold (threshold where antlerless harvest is considered) in 2001, data from the 2002 surveys show all areas below this level.

ELK

Elk are distributed across Idaho and are classified as habitat generalists. Elk populations can be influenced by human harvest. Because harvest is highly influenced by access on public lands, the most critical habitat factor facing managers is the use of roads (Kuck and Compton, 1999).

Overall, elk populations statewide are near all time highs and objectives are generally being met statewide for total cows, bulls, and adult bulls; however, some zones are not meeting these objectives. The IDFG Plan objectives for elk include: Adult bull:100 cow and total bull:100 cow ratios. Table 3.72 shows that areas on the Forest are generally meeting or exceeding objectives.

Table 3. 72. Elk Objectives and Current Status for Zones on the Caribou.

Zone	Units	Adult Bull: 100Cows Objectives[1]	Adult Bull: 100 Cows Current Status	Total Bull: 100 Cows Objectives[1]	Total Bull: 100 Cows Current Status	Population Objectives	Population Objectives Current Status
Bannock	70, 71, 73	10-14	24 (est.)	18-24	38 (est.)	770	No data
Bear River	75, 78	10-14	12 (1999)	18-24	23 (1999)	600	594*
Diamond Creek	66a, 76	18-24	19 (2002)	30-35	35 (2002)	2,100	3690**
Tex Creek	66	10-14	18 (2002)	18-24	32 (2002)	2,675-3,975	4,298

1 Adult bulls are only branch-antlered; total bulls column includes spikes which are generally yearlings.

* 1996 flight data.

** 2002 population data.

Thomas (2000) studied elk from the Tex Creek winter range. He found a high fidelity to summer ranges. Sixty to sixty-five percent of the elk wintering in Tex Creek summered south of McCoy Creek, and most of the mature bulls summered in this area. Large contiguous blocks of habitat characterize Unit 66a. Almost one-half of the elk marked in this study summer in the largely non-motorized block between Bald Mountain and Tincup Mountain.

Zones 66a and 76 are managed to provide trophy bull elk and for semi-primitive hunt experience. Of special concern within the Diamond Creek Zone, is the area from Diamond Creek north to Tincup, where cross-country travel is currently allowed. Overall, the zone is still meeting state population goals, but concerns remain over increasing motorized use in the area and what effects it could have on the bull elk using this part of the zone. Elk population objectives have been raised to maintain the trophy bull elk hunt in this zone.

Summer Habitat Effectiveness and Hunting Vulnerability

Summer habitat effectiveness is defined as the percent of available habitat that is usable by elk from late green-up to hunting season. Factors that influence summer habitat effectiveness include: roads, special features, such as wet sites, riparian areas, movement corridors; cover; domestic livestock; and land ownership patterns (Christensen, *et al*, 1993). The presence and use of motorized roads is the major impact on habitat effectiveness (Christensen, *et al*, 1993). This analysis also includes motorized trails in the calculation of open motorized route densities (OMRD) (See Appendix D.) For areas intended to benefit summer habitat range and retain high use, habitat effectiveness should be greater than seventy percent (70%) or more. This roughly equates to an open route density of 0.7 miles per square mile (mi/mi^2). For areas where big game is a primary resource consideration, habitat effectiveness should be fifty percent (50%) or greater. This roughly equates to an open route density of 1.9 mi/mi^2.

The four areas that are not meeting State of Idaho big game population objectives are listed below. Based on Christensen, *et al*, OMRDs less than 0.7 mi/mi^2 would improve summer habitat effectiveness and benefit big game.

Hunting Season Vulnerability

Vulnerability results from a complex relationship between access, cover, topography, hunter density, and weather. The measure of success for elk vulnerability is often the number of bulls per hundred cows surviving the hunting season.

Access and use of roads appear to be the most significant factors in vulnerability analysis (Christensen, *et al*, 1993). In areas where heavy cover is not available, reduced open road densities contribute to reducing both deer and elk vulnerability. In areas with more open cover and gentler terrain, roads speed up the harvest of available bulls and make bulls more vulnerable throughout the season. Increased emphasis should be placed on security where poor cover conditions exist. Additionally, decreases in OMRD might occur where population objectives are not being met.

Security is the result of a combination of factors that allow elk to remain in a specific area while under stress from hunting. Specifically, security areas are defined as areas of cover (vegetative or topographic) large enough and far enough away from open roads to provide security. In one southwestern Montana analysis (Hillis, *et al*, 1991), security was defined as non-linear blocks, over .5 miles from an open route and at least 250 acres in size. The Montana analysis also determined that at least a minimum of thirty percent (30%) security should be available in a herd's summer/fall range. These same criteria were used to map security areas for the Caribou National Forest through the use of a Geographic Information System (GIS).

The map was produced and checked for accuracy. Several polygons met the minimum size but were dominated by sagebrush cover and were dropped from consideration. Because sagebrush security areas were dropped, these percentages are conservative. Several polygons

were adjacent to the Forest boundary, and roads on adjacent lands had not been incorporated. These polygons were revised to be more accurate.

Table 3. 73 Existing Security Area and Relationship to Goal.

Geographic Area	Percent Security in Area	Status
Malad Range South	19%	Does not meet
Portneuf Range	40%	Meets
South End Bear River	19%	Does not meet
Diamond Creek	16%	Does not meet

BIG GAME WINTER RANGE

The AMS (1999) identified concerns regarding rangeland habitats as they relate to wintering big game. As numbers of elk increase, concerns increase about competition with wintering mule deer. Grazing also has the potential to adversely impact big game winter range. In addition, construction of new homes and developments on winter range is increasing, and the trend is expected to continue. These factors and trends increase the importance of public land as winter range. In addition, changes in vegetation composition, such as a decrease in shrubs and grasses in the understory, have altered winter range values. And finally, increased access and recreation may be increasing disturbance and vulnerability of big game species.

The main issues in winter range management include: forage quantity and quality; development on adjacent, private land winter range; thermal cover; roads and other areas of potential disturbance; and livestock management (Christensen, *et al*, 1993). Thermal cover is a site-specific consideration and was not analyzed at the forest scale.

Winter ranges were originally mapped from the 1985 Forest Plan. In 1999, winter range was re-mapped by Forest Service and IDFG biologists to incorporate new information. This mapping was very broad-scale and was further refined by Forest Service and IDFG Biologists in early 2001 (See the Wildlife Section of Appendix D for more information).

Table 3. 74 Winter Range Travel Management and Potential for Development.

Geographic Area	Current Travel Management in Winter[1]	Potential for Development on Adjacent Lands[2]
Malad Range South	Restricted to designated routes	Moderate
Portneuf Range	Restricted to designated routes	Low
South End Bear River	Partially restricted to designated routes	High
Diamond Creek	Partially restricted to designated routes	Low

1 Caribou National Forest Travel Map, 1994.

2 Based on results from Caribou Adjacency Analysis (Rine, 2001), which incorporates local planning and zoning regulations and professional judgment based on the past and current situation.

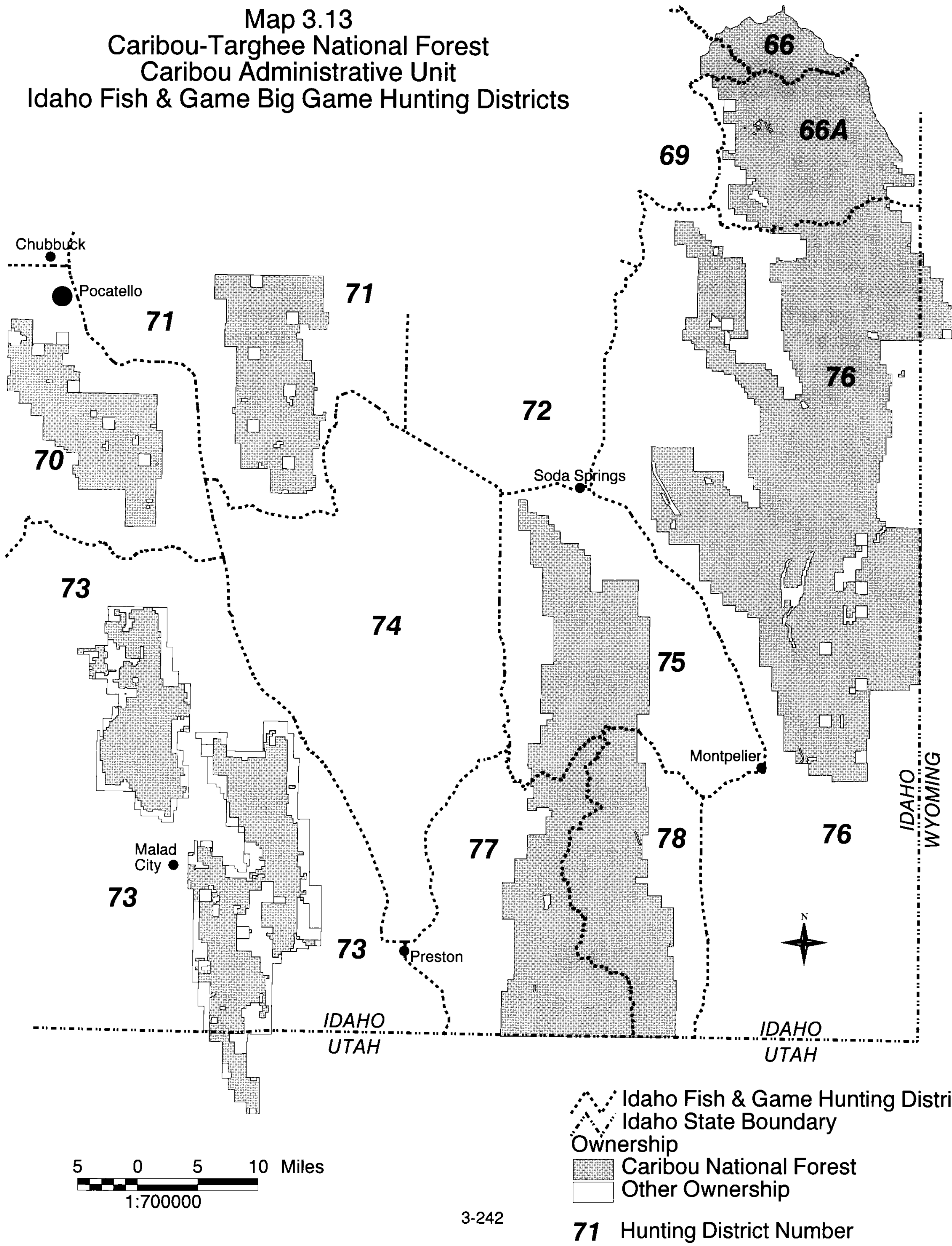
Other

CORRIDORS

Corridors can be defined as avenues along which wide-ranging animals can travel, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas.

Most of the mapping efforts have focused on large-scale dispersal corridors, generally from the Northern Rockies (Glacier) to the Greater Yellowstone Ecosystem. Part of the Forest is within the Greater Yellowstone Ecosystem and may provide movement corridors or linkages to the Targhee National forest to the north, the Bridger-Teton National Forest to the east, and the Wasatch-Cache National Forest to the south. (See Wildlife section of Appendix D for more information.)

Map 3.13
Caribou-Targhee National Forest
Caribou Administrative Unit
Idaho Fish & Game Big Game Hunting Districts



Air Quality and Visibility

Analysis Scale: Forest-wide

Air Quality and Visibility could be affected by Forest Plan implementation, however, these are both governed by the Clean Air Act. This was determined not to be an issue which would drive formulation of alternatives, however, effects are displayed in the FEIS by measuring the following:

♦ **Number of acres treated with prescribed fire.**

Baseline Indicator: 2,200 acres including 1,200 acres wildfire and 1,000 acres prescribed fire averaged over the past 30 years.

♦ **Tons of PM_{10} and $PM_{2.5}$ emitted on an annual basis.**

Baseline Indicator: Estimated 260 tons of PM_{10} and 221 tons of $PM_{2.5}$

BACKGROUND TO SUBJECT

The Federal Clean Air Act is a legal mandate designed to protect human health and welfare from air pollution. National Ambient Air Quality Standards (NAAQS) are defined in the Clean Air Act as levels of pollutants above which may result in detrimental effects on human health and welfare.

The United States Environmental Protection Agency (EPA), in conjunction with the states of Idaho, Wyoming, and Utah, has established standards for pollutants to protect public health and welfare. These standards include criteria pollutants such as PM_{10} (particles that are less than ten microns in diameter or less, as in smoke). NAAQS require that PM_{10} remain below fifty micrograms per cubic meter when averaged over one year and must remain below 150 micrograms per cubic meter averaged over a 24-hour period. Standards also have been established for $PM_{2.5}$ (See Table 3.75 for Idaho NAAQS standards).

The Clean Air Act also mandates "the prevention of any future, and the remedying of any existing impairment of visibility in mandatory Class I areas which impairment results from manmade air pollution." Air pollution is defined as the presence in the atmosphere of a substance or substances added directly or indirectly by a human act, in such amounts to adversely affect humans, animals, vegetation, or materials. Air pollutants are classified into two categories: primary and secondary. Primary pollutants are those directly emitted into the air. Under certain conditions, primary pollutants can undergo chemical reactions with the atmosphere and produce new substances known as secondary pollutants.

Another provision of the Clean air Act is the Prevention of Significant Deterioration (PSD). PSD provisions are used to prevent areas that currently have very clean air from being polluted up to the maximum point established by the NAAQS. Class I areas have the most stringent restrictions on how much additional pollution can be added to the air.

Class I areas[42] have the highest air quality protection standards while Class II areas have a moderate level of protection. All lands within the Forest have been designated as Class II[43] areas as authorized by the Clean Air Act. The nearest Class I area to the Caribou National Forest is the Bridger Wilderness, which is approximately 100 kilometers east of the Forest. Mandatory Class I areas that lie within 124 miles (200 kilometers) of the Forest boundaries are Craters of the Moon National Monument, Teton National Park, Yellowstone National Park, Bridger Wilderness Area, Teton Wilderness Area, Fitzpatrick Wilderness Area, and Washakie Wilderness Area. These areas are considered receptors to increased emissions, such as smoke.

Generally, conditions of excellent air quality exist on National Forest System lands administered by the Forest (EPA, 1998). The Forest lies within Airshed 20 in the State of Idaho, with small acreages in Utah and Wyoming airsheds. Occasionally, air quality is affected adversely from pollutants from adjacent communities such as Pocatello and Soda Springs. These effects occur during winter inversions or when stable air masses develop under stationary, high-pressure systems. Other activities that may adversely affect air quality usually originate upwind from National Forest System lands, including power plant, factory, and auto emissions, along with agricultural burning. Management activities on the Forest, such as prescribed burning, mining, and road construction and use, also produce particulate matter and carbon monoxide emissions. These activities create fugitive dust and smoke that are carried and dispersed by prevailing winds. Dispersed recreational activities involving motorized vehicles on the Forest are also a source of pollution, but they do not currently exceed, nor are they expected to exceed NAAQS in the future.

The area of Pocatello and Chubbuck, Idaho, is currently a non-attainment area[44] for PM_{10} and is considered an impact area in Airsheds 19 and 20. During 1999, the Portneuf Valley airshed exceeded the Ambient Air Quality Standards (NAAQS) on three occasions from a variety of sources. The variance was caused by meteorological conditions that allowed a build-up of PM_{10} pollutants. The State of Idaho, Department of Environmental Quality, Airshed Management Program in the Portneuf Valley is developing an implementation plan to address the problems and ensure compliance with air quality standards (T.Floyd, pers. comm., DEQ, 2001). Map 3.14 shows the location of the airsheds in Idaho and Montana.

42 **Class I Area -** Under the 1977 Clean Air Act amendments (42 U.S.C. 7401 *et seq*) all international parks, national parks greater than 6,000 acres, and national wilderness areas greater than 5,000 acres which existed on August 7, 1997, are designated for the most stringent degree of protection from future degradation of air quality. This class provides the most protection to pristine lands by severely limiting the amount of additional air pollution that can be added to these lands. Any subsequent additions of land to these Class I Areas also become Class I.

43 **Class II Area** - Any area cleaner than federal air quality standards which is designated for a moderate degree of protection from future air quality degradation. Moderate increases in new pollution may be permitted in a Class II area.

44 **Non-attainment Area** is an area that does not meet National Ambient Air Quality Standards (NAAQS).

Map 3. 14. Montana/Idaho Airshed Map.

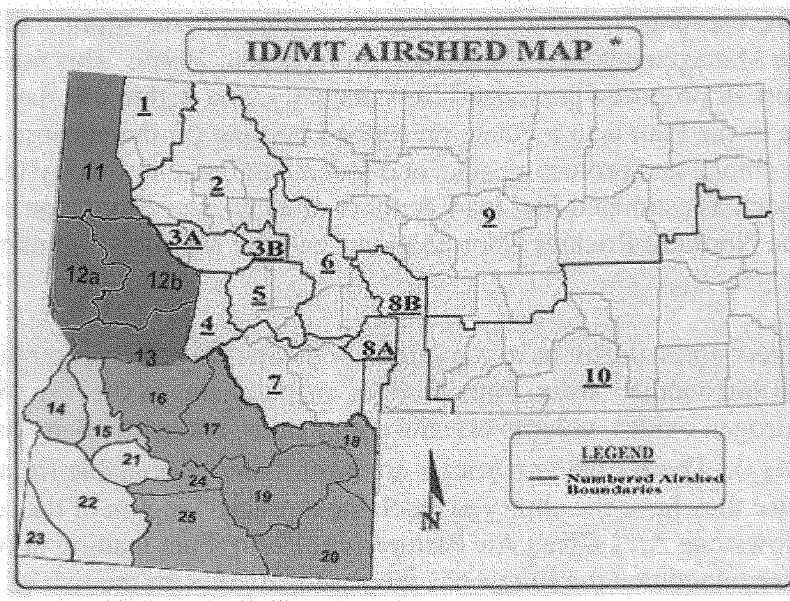


Table 3. 75. State of Idaho and National Ambient Air Quality Standards.

(Source: Code of Federal Regulations, 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards.)

Pollutant	Averaging Time	Allowable Concentration
Ozone	1 hour 8 hours	235 ug/m3 (0.12 ppm) 157 ug/m3 (0.08 ppm)
Carbon Monoxide	1 hour 8 hours	40,000 ug/m3 (35 ppm) 10,000 ug/m3 (9.0 ppm)
Nitrogen Oxides	Annual Arithmetic Mean	100 ug/m3 (0.05 ppm)
Sulfur Dioxide	Annual Arithmetic Mean 24 hours 3 hours	80 ug/m3 (0.03 ppm) 365 ug/m3 (0.14 ppm) 1,300 ug/m (0.5 ppm)
Particulate Matter as PM10	Annual Arithmetic Mean 24 hours	50 ug/m3 150 ug/m3
Particulate Matter as PM2.5	Annual Arithmetic Mean 24 hours	15 ug/m3 65 ug/m3

Ug/m3 = micrograms per cubic meter; ppm = parts per million.

Since 1998, the Caribou National Forest has been subject to the Montana/Idaho State Airshed Group Smoke Management Plan (Mathews and Acheson, 1999). This plan requires the Forest to report all proposed prescribed fires annually, and within one day prior to burning. The objective of the Plan is to regulate prescribed burning for the purpose of minimizing impacts from smoke and protecting state and federal ambient air quality standards. Information such as estimated fuel load, number of acres, elevation, type of burn, etc. is reported to the Northern Rockies Coordination Center in Missoula, Montana, before burning is authorized.

Fire management and wildfire have the greatest potential to effect air quality and visibility on the Forest and surrounding areas. Fires produce air pollutants in the form of carbon monoxide, nitrogen oxides, volatile organic compounds, and particulate matter (measured by PM_{10} and $PM_{2.5}$). These smaller particles are most likely responsible for adverse health effects, because they have the ability to reach the thoracic[45] region of the respiratory tract (Greater Yellowstone Area Clean Air Partnership, 1999). Fuel loading in both forested and non-forested vegetation on the Forest has increased, along with the risk of uncontrolled wildfires that may contribute to smoke emissions in the future. Prescribed fire provides a method to control the timing, intensity and amounts of smoke emissions, reduce fuel build-up, and reduce the risks associated with uncontrolled wildfire (J. Kidd, 2001).

Smoke produced from wildfires can be greater than smoke produced from controlled burning, since the latter provides the opportunity to burn when environmental conditions are within a prescribed window of opportunity.

Prescribed fires on the Forest are conducted only when favorable meteorological conditions and air quality conditions exist and when state and federal ambient air quality standards will not be exceeded and when sensitive receptors will not be impacted based on site-specific analysis. Smoke dispersion models are produced by the Airshed Group to determine if restrictions are necessary. The Forest is not permitted to ignite prescribed fires when burning restrictions are imposed by the Monitoring Unit in Missoula, Montana. The Forest Service works cooperatively with the Idaho Department of Environmental Quality (DEQ) during burning operations. When predicted conditions change and smoke dispersion is not occurring as planned, the Forest Service informs DEQ of these conditions and adjusts treatments accordingly. In the past, approximately twenty percent of prescribed fires on the Forest have been conducted in the spring, and about eighty percent have been conducted in the fall (Conran, 2001).

Because the State of Idaho regulates control of air pollution through Title 39 of the Idaho Code, the Forest Service protects air quality through compliance with rules, regulations, and procedures under the Idaho Department of Environmental Quality. The Forest Service will continue to cooperate with other Federal, State and local air quality regulatory agencies to maintain or improve air quality. During burning treatments, the Forest Service will continue to follow the Montana/Idaho Smoke Management Plan and Program and comply with the

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[45] **Thoracic** relates to the area of the human body between the neck and abdomen where the heart and lungs lie.

EPA's Interim Air quality Policy on Wildland and Prescribed Fires (EPA, 1998). The Interim Policy is a Federal policy that reconciles the competing need to conduct prescribed fires, while at the same time, maintaining clean air to protect public health.

VISIBILITY

Visibility varies with patterns in weather and winds (and the effects of winds on coarse particles). Dust, smoke, and emissions from industrial, agricultural, and auto emissions reduce visibility. It is estimated that the cleanest twenty percent of the days probably approach natural conditions. Smoke from frequent wildfires is suspected to have reduced pre-settlement visibility below current levels during some summer months (Greater Yellowstone Area Clean Air Partnership, 1999). Research suggests that wildland fires consumed as many as 86 million hectares per year in the contiguous United States during pre-industrial conditions (Leenhouts, 1998).

Today, about five to seven million hectares are burned annually in the U.S. which indicates that reduced visibility caused by smoke may have occurred more during pre-industrial conditions. With added industrial and auto emissions, current visibility conditions are most likely worse than pre-industrial conditions. According to the EPA 1997 National Air Quality Trends, the Forest falls within the zone with the least amount of visibility impairment in the United States (EPA, 1998).

No air quality monitoring stations are located on the Forest. However, stations in Pocatello and Soda Springs provide a source for air quality monitoring data applicable to forest management. Table 3.1 provides data for PM_{10} air quality monitoring in Soda Springs (IDEQ, 1997).

Table 3. 76. PM_{10} Ambient Air Quality Data for Soda Springs, Idaho.

Year	Annual Average (ug/m3)	24-hour Maximum (ug/m3)	Number of Air Quality Standard Exceedances
1990	26.8	96	0
1991	24.9	59	0
1992	31.6	153	1
1993	24.9	55	0
1994	25.4	80	0
1995	20.1	73	0

Portions of the Forest are adjacent to Pocatello and Chubbuck, a PM_{10} non-attainment area, which requires a more complex analysis. Information required for analysis includes an emissions estimate calculated from First Order Fire Effects Model (FOFEM), appropriate meteorology, seasonal emissions, average fuel type and loading, type and size of burns, and application of mitigation measures, including standards and guidelines identified in the Revised Forest Plan. These analyses are conducted for all site-specific projects that may affect the air quality of Pocatello and Chubbuck, Idaho and adjacent Class I wilderness areas.

Other

Resources

Fire Management

Analysis Scale: Forest-wide

Fire Management

The Fire Management program on the Caribou National Forest has two broad purposes:

- To protect and enhance Forest resources through wildfire prevention and suppression, fuel reduction, and fire use, which includes prescribed fire and wildland fire use,, and by applying the appropriate management response to all wildland ignitions;
- To meet Forest goals and objectives through fire use (prescribed fire and wildland use).

BACKGROUND TO SUBJECT

The Fire Management program is responsible for all aspects of fire prevention and suppression, and fire use. Fire suppression actions are taken on all wildfires. Wildfires are defined as unwanted wildland fires, which include lightning-ignited fires that are not managed for wildland fire use, human-ignited fires other than those intentionally started by the agency and managed as a prescribed fire, or any wildland fire use or prescribed fire that no longer meet prestated prescriptive criteria. All wildfires receive the appropriate suppression response. The decision to use a particular suppression tactic depends on many factors including threats to life, property, and investments; weather conditions; fuels; terrain; and the availability of firefighting personnel and equipment.

Fire use includes both prescribed fire and wildland fire use. Wildland fire use is defined as the management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in Fire Management Plans. Strategies regarding the use of fire in all aspects of ecosystem management are currently being developed, as are specific plans for wildland fire use. Currently, no approved wildland fire use plans are in place on the Forest.

Although fire is a natural ecological process, it differs from insects, diseases, and wind-throw in that fire is *intentionally* used as a tool to manage natural resources. The use of prescribed fire has become more prevalent since 1970. These burns have affected a relatively modest portion of the Forest averaging approximately 970 acres annually since 1970 to 2000. This is approximately one-third of the 3,000 acres annually proposed for prescribed fire treatment in the 1985 Forest Plan. Most of the limited treatments occurred in the sagebrush and mountain brush vegetation types, often near the Forest boundary and rural communities. In addition, it is substantially less than the 42,000 acres that Barrett's (1994) fire history study of on the Forest suggests would be affected by wildfire annually under the historic fire regimes.

The 1985 Forest Plan also contained direction to suppress all wildfires to limit their size to ten acres or less. This suppression objective proved to be both unrealistic and in some cases ineffective in achieving resource objectives.

Periods of drought over the last fifteen years have resulted in stressed vegetation that is more susceptible to uncharacteristic wildland fire. While the Caribou NF has not experienced wildland fires to the same extent or severity as other areas in the western U.S. during this period, the potential for uncharacteristically large wildland fires currently exists on the Forest, particularly in Fire Regimes II, III, and IV. (See *Ecosystem Management, Disturbance* section of this chapter for a discussion of prescribed fire, wildfire, wildland fire, Fire Regimes, Condition Classes, and Wildfire Hazard Rating.)

NATIONAL FIRE PLAN

In August 2000 the Administration directed the Secretaries of Agriculture and Interior to prepare a report that would recommend how to best respond to the year's severe wildland fires, reduce the impact of such wildland fires on rural communities, and ensure sufficient firefighting resources in the future. The report, entitled *Managing the Impacts of Wildfire on Communities and the Environment: A report to the President in response to the wildfires of 2000*, which became known as the National Fire Plan [Secretaries of Agriculture and Interior 2000] was approved in September 2000.

The Congress also directed the Departments of Agriculture and Interior to engage the Governors in a collaborative structure to cooperatively develop a coordinated National ten-year comprehensive strategy with the States as full partners in the planning, decision-making, and implementation of the National Fire Plan for the long-term. The *Ten-Year Comprehensive Strategy* [Departments of Interior and Agriculture 2001] was released in August 2001. The primary goals of the *Ten-Year Comprehensive Strategy* are to: (1) improve fire prevention and suppression, (2) reduce hazardous fuels, (3) restore fire-adapted ecosystems, and (4) promote community assistance.

The final piece was to bring together all Federal, State, Tribal, and local stakeholders for the common purpose of creating a plan to implement the *Ten-Year Comprehensive Strategy*. In May 2002 the Secretaries of Agriculture and Interior, the Governors of Montana, Wyoming, Idaho, and Oregon, and the Director of the Council on Environmental Quality signed *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment* [Departments of Interior and Agriculture 2002a]. This is an Implementation Plan for the *Ten-Year Comprehensive Strategy* that emphasizes a collaborative, community-based approach to address wildland fire issues.

In August 2002 *Restoring Fire-adapted Ecosystems on Federal Lands – A Cohesive Fuel Treatment Strategy for Protecting People and Sustaining Natural Resources* [Departments of Interior and Agriculture 2002b] -- the *Cohesive Strategy*, for short -- was released in draft form. The *Cohesive Strategy* is intended to:

- Better ensure public and firefighter safety;

- Reduce risks from wildland fire to communities;
- Reduce wildland fire costs, losses, and damages;
- Promote efficient uses of forest products and biomass residue;
- Improve the resilience and sustainability of forests, woodlands, shrublands, and grasslands; and
- Conserve priority watersheds, air quality, cultural and historic features, species, and biodiversity.

The National Fire Plan, *Ten-Year Comprehensive Strategy* and Implementation Plan, and the *Cohesive Strategy* emphasize measures designed to reduce the risk to communities and the environment from wildland fires. These four integrated documents are expected to guide the Fire Management program on the Forest for the foreseeable future to combine cost-effective fire preparedness and suppression to protect human communities and restore fire-adapted vegetative communities with a proactive approach that recognizes fire as part of healthy, sustainable ecosystem.

WILDLAND URBAN INTERFACE

The wildland urban interface is defined as areas where humans and their development meet or intermix with undeveloped wildland or vegetative fuels. Interface may include expanding urban areas, encroaching subdivisions, isolated cabins, or infrastructure developments, such as power lines, that link urban areas. Development on private lands adjacent to the Forest has accelerated in recent years increasing the amount of urban wildland-urban interface.

The presence of development adjacent to wildland fuels affects fire management decisions by narrowing the fire management options in interface areas due to concerns fire may threaten private developments. The cost of fire suppression is often higher in interface areas, and often the ability to manage vegetation is reduced. The risk of human ignitions also increases as development increases in interface areas. The National Fire Plan, the Ten-Year Comprehensive Strategy and Implementation Plan, and the Cohesive Strategy prioritized reducing the risk of wildland fires near interface communities as part of an overall framework for fire management and forest health programs. To reduce the risk to communities the Forest plans to treat approximately 200 acres in the wildland-urban interface in 2002, 300 acres in 2003, and an increased emphasis is expected in the years beyond. The importance of safeguarding interface communities will continue to grow as population increases and more development occurs adjacent to wildlands.

The Fire Management Program should focus on moving acres in Condition Classes 2 and 3 to Condition Classes 1 and 2. In accordance with the National Fire Plan and associated National management direction, the first management priority should focus on reducing the risk to communities and the environment from wildland fires with emphasis on reducing the risk to people, property, and natural resources in the wildland-urban interface. In addition, Forest vegetation resources could benefit from the development and implementation of

wildland fire use plans that allow fire to play a natural role where appropriate and desirable. (See also Issue 3: Ecosystem Management, Disturbance for more information on fire.)

Effects on the fire management program are discussed in the Disturbances section of Issue 3, Ecosystem Management. For this reason, fire will not be displayed in Chapter 4 as a separate resource, it is incorporated into Issue 3, in particular, Indicator EM 3: Fire Condition Classes.

Heritage Resources

Analysis Scale: Forest-wide

Heritage Resources

The heritage resource program on the Forest is based on compliance with a myriad of laws, regulations and policies regarding antiquities. Because Forest Plan direction will be consistent in all Alternatives, no indicator was developed. The main two laws are:

- National Historic Preservation Act
- Archaeological Resource Protection Act

BACKGROUND TO SUBJECT

Archaeological and ethnographic sources indicate the historic and prehistoric use of the Forest for camping, hunting, fishing, gathering, grazing, mining, and traveling. Archaeological and ethnographical investigations of known, and as yet undiscovered, cultural resources may offer insights into historic and prehistoric land use and settlement patterns of the area. Archaeological and historical resources, managed under the Heritage Program, represent the physical remains of past human activities on the National Forests. The Heritage Program also manages sacred sites and traditional cultural properties, which may or may not have physical remains associated.

Evidence of prehistoric occupation and use, spanning the last 11,000 years, are present on the Forest and include projectile points, rock shelters, stone circles, hunting blinds and bison kill sites. Evidence of historical occupation and use include wagon trails, homesteads, mining sites, Civilian Conversation Corps camps, and other developments.

Cultural resources are non-renewable resources. As such, Federal regulations have been enacted that prohibit the destruction of significant cultural sites and obligate Federal agencies, including the Forest Service, to protect and manage cultural resource properties. Disturbing sites or collecting and removing artifacts from Federal lands without a permit is prohibited.

Human occupation of the area has been continuous for at least the last 11,000 years and probably longer. Remains of past human activity are found throughout the Forest. Table 3.77 provides the status of land inventoried for cultural resources and sites found over the last thirty-three years since the National Historic Preservation Act of 1966 was passed.

Table 3. 77 Heritage Programs Status, as of June 2000.

Program Activity or Objective	Accomplishment
Acres Surveyed	110,000
Percent of Forest Surveyed	10%
Number of NRHP Listings	2
Number of Eligible NRHP Listings	21
Number of Unevaluated Sites	150
Number of Potential Undiscovered Sites	1500
Estimated Number of Potential NRHP Eligible Undiscovered Sites	600

In addition to the properties listed in Table 3.77, four sites across the Forest have been interpreted for public appreciation and awareness. Research projects have been conducted on the Forest, and public participation projects, such as "Passport in Time" and "Windows on the Past," have become increasingly popular with the public.

The Heritage Program represents the finite resource of physical remains of past human life on the National Forests. A life way is defined as the way humans interact and survive within an ecosystem. Remains of prehistoric lifeways include projectile points, rock shelters, and stone circles. Representations of the more recent historic period include wagon trails, homesteads, mining sites and Civilian Conservation Corps camps. Once heritage sites are disturbed or artifacts removed from their original setting, cultural information can be lost forever. The Archeological Resources Protection Act and other statutes protect sites on public lands.

SPECIAL AREAS OF INTEREST ON THE FOREST

The Forest Service protects significant heritage resources and shares their value with the American people. The stewardship role includes surveys and inventories of cultural resources and providing programs that bring the past alive to forest visitors. Interpretation opportunities regarding important aspects of history are a great asset to the Caribou National Forest and include the following special areas of interest:

The Oregon Trail is very important in the history of the Western United States. In many ways the Oregon Trail symbolizes the west. Early mountain men and trappers explored and charted the trail. Thousand of people traveled over what was to become one of the greatest mass overland migration routes in history. Toward the last of the migration, the overland stage and Pony Express followed several portions of the trail. Finally the first transcontinental railroad followed portions of the same route. The Oregon Trail was the main stream of westward expansion. Remnants of the Oregon Trail remain visible for visitors of the Caribou Forest.

The Lander Trail or Lander Cut-off was surveyed and constructed by Frederick West Lander in 1857-1860. It is the only stretch of the Oregon Trail system to ever be subsidized

and constructed by the federal government. More than 13,000 emigrants traveled it in 1859, its first year of use. Remnants of the Lander Trail remain visible for visitors of the Caribou Forest.

A modest gold rush began in the **Caribou Mountain area** in 1870 when Jesse "Cariboo Jack" Fairchilds discovered gold in the area. In the early days of placer operations, Caribou Mountain had two mining districts, one on the east side of Iowa bar, which was later replaced by Cariboo City, and the other on the west with Keenan City as its center. The majority of the activities in these cities were declining into the early 1900's. Caribou city developed in to the largest camp in the district, reaching a population of about 1,500. Keenan had a population of more than 500 and a 'china town' with a population of around 400. Both Keenan and Cariboo City were boisterous mining towns until placers ceased to be profitable, and they joined other ghost towns of Idaho in becoming a reminder of a vanished era in Idaho history. Remnants of the Cariboo and Keenan City Gold mining activities remain visible for visitors of the Caribou Forest.

Other

Resources

Noxious Weeds

The expansion of noxious weeds on the forest is out-pacing containment and control efforts for some species of weeds. New infestations, both on National Forest System lands and on adjacent lands, pose risks for further expansion and loss of biological diversity.

Because Forest Plan noxious weed direction will be consistent in all Alternatives, no noxious weed indicator was developed.

BACKGROUND TO SUBJECT

Executive Order 13112 (Invasive Species, February 1999) defines the following:

- **Alien Species** is "...any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem." That is, a species introduced and occurring in locations beyond its known historical range.
- **Invasive Species** is an alien "species that demonstrates rapid growth, and spread, invades habitats and displaces other species" (NRCS – Wetland Science Institute, 2002). This is a species "whose introduction does or is likely to cause economic or environmental harm or harm to human health." (EO 13112).
- **Noxious Species** are those of foreign origin, not widely prevalent in the United States that can injure crops, ecosystems, interests of agriculture, or the fish and wildlife resources. (Federal Noxious Weed Act). They generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, and a carrier or host to serious insects or disease.

It is the responsibility of each state to list the noxious weeds within the state. Counties also have the authority to list local problems. Within the State of Idaho, the most current list was created by the State law in 2001 when thirty-six species were listed. The criteria for designation are: a non-native of Idaho, potentially harmful to the state, eradication is economically and physically feasible, and the potential adverse impact must exceed the cost of control. These weeds can be found in "Idaho's Noxious Weeds" distributed through the University of Idaho, Cooperative Extension Service.

In March 1998 the "Pulling Together - National Strategy of Invasive Plant Management" was adopted by the Administration that detailed the priorities for effective prevention, control, and restoration. This document brought together various interests, including private land owners, industry and government agencies at all levels, to highlight ways to battle invasive plants. In September 1998 the Forest Service implemented "Stemming the Invasive Tide - a Forest Service Strategy for Noxious and Nonnative Invasive Plant Management." This

document explains the responsibility of the Forest Service to integrate noxious weed management in ecosystem analysis, assessment, and forest planning.

Other direction comes from "Idaho's Strategic Plan for Managing Noxious Weeds," published by the Idaho State Department of Agriculture in February, 1999. The Intermountain Region of the Forest Service was one of the cooperators in this effort. In February 2001, the Caribou-Targhee NF completed a forest strategy for noxious weeds that built from direction found in the National, Forest Service, and State strategies. The priorities for treatment are:

- Preventing new invaders
- Eradicating new invaders and preventing the conditions that allow them to spread
- Managing large infestations by containment

NOXIOUS WEEDS

Noxious weeds can be introduced intentionally or accidentally, but on the forest most infestations occur accidentally and tend to move along established corridors. They are often "hitchhikers" on vehicles, people's footwear, or animals' feet or hair. Contaminated vehicles are one of the primary pathways for the introduction of noxious weeds, because vehicles tend to cover the most ground, including cross-country travel. Animals, livestock, wildlife, and birds, also tend to spread seeds when they brush up against the plants on trails or eat the seedheads, and then, eliminate them in a new location. People hiking through an infested area can also inadvertently spread seeds by brushing up against the plants. The seeds adhere to clothing or get caught in footwear.

Sometimes in agricultural areas, noxious weed seeds are present in seed mixes and get planted along with the "good" plants. If successful germination occurs, these undesirable species can take over an area. This also is a risk in restoration projects when seed sources are not certified. Noxious weeds can invade agricultural crops too. When the crop is harvested, the weed seeds are carried with the crop to new locations where the seeds germinate, given the right conditions. This happens in hay crops and was the reason the State implemented a "weed-seed free" hay program. Hay brought onto National Forest System lands by campers and hunters must be certified weed-free (Forcella, 1992).

Noxious weeds are especially known for being able to establish in an area but remain unnoticed for long periods before they start to spread. This lag period can last many years before the population begins to grow and spread to the point their presence is noticed (CAST, 2002).

WHAT ARE THE PROBLEMS IN PROTECTING AGAINST NOXIOUS WEEDS?

Problems that allow noxious weeds to become established on public lands include the following (CAST, 2002):

Public indifference – Most public users, including some land managers, do not realize the threat to natural ecosystems and cannot identify these weeds for what they are. They do not understand the scope of the problem and how serious the consequences are. This has also led to a lack of funding to address the problem (Idaho's Strategic Plan).

Ease of introduction and movement – Many of these plants have special adaptations (stickers or thorns) that allow them to move easily when brushed by vehicles, clothing, hair, fur, etc. Some of these weeds are palatable to animals and are eaten, then spread to new locations when eliminated by the animal. Some seeds are adapted and stay viable even after trips through an animal's digestive tract. Water and wind can carry seeds, also. Infestations along riparian zones are especially good at spreading quickly downstream.

Lack of effective emergency pesticides – Many of noxious weeds are not effectively controlled with existing pesticides, or the weeds have evolved to withstand pesticide treatment. New methods of combating them are under development constantly.

Lack of research addressing prevention and control needs – Some of these weeds are establishing so quickly, that research cannot keep up with the control methods or field research. Biological control development and testing take many years before the Environmental Protection Agency will allow their release (USDA, 1998). Research shows that four to six natural enemies must be established before biological control is effective (Story, 1992).

Inadequate inspection techniques and procedures – The use of certified hay is quickly becoming a requirement in most states. However, cleaning vehicles after exposure to weed infestations, such as equipment used to suppress wildland fire, is still not practical in all land management situations. Technology is being developed to allow cleaning and washing on-site.

Inadequate coordination and cooperation among state and federal agencies and industry – This problem is finally receiving attention and action through the establishment of Cooperative Weed Management Areas. Cooperative Weed Management groups have brought noxious weed abatement to the attention of all the landowners within each area. Strategies allow landowners and land management agencies to work across property boundaries to address the problem. In Idaho, a statewide database and website have been established to help with this coordination effort (Idaho Department of Agriculture).

Noxious Weed Conditions on the Caribou National Forest

The Forest's Noxious Weed Management Strategy identifies thirteen action items to guide forest management in the prevention, containment and control of noxious weeds, and includes education, awareness, and Forest personnel participation in Cooperative Weed Management Areas.

The Forest in the 1996 Caribou National Forest Noxious Weed and Poisonous Plant Control Program Environmental Assessment (EA) and Finding of No Significant Impact (FONSI)

adopted integrated Pest Management (IPM) guidelines. The EA analyzed various methods for forest personnel to consider on a site-specific basis for weed management. An IPM strategy was determined to be the most sound, ecologically and economically, to treat uncontrolled noxious weeds. Treatment techniques considered included biological (insects, pathogens), cultural (grazing, competing vegetation), mechanical, herbicides, and manual controls. Prevention of establishment and education are elements of the alternative adopted.

Integrated Pest Management is a systems approach to management of undesirable plants. It is a multi-disciplinary, ecological approach to managing weeds. IPM emphasizes the best management strategies for weed control and uses the best control techniques available for the target species. The degree of control, the technique's effectiveness, environmental factors, land use economics and the extent and nature of the infestation are all considered in choosing a control method that will effectively limit the weeds' impact and spread. (Mullin, 1992) Knowledge of non-target vegetation is critical to limit impacts. All control options have limitations, thus the need to have several choices for each infestation.

Noxious weeds are found across the Forest. In 2001, the Forest reported 85,514 acres were infested by noxious weeds. Approximately 5,940 acres were treated in the same year using a variety of methods. This disparity in acreage treated is due to budget limitations. Table 3.78 shows the plant species on the forest that have been designated as noxious by the State of Idaho Department of Agriculture and the Wyoming Department of Agriculture and the infestation levels and acres treated in 2000.

Leafy spurge is the only species that occurs in concentrated areas of large acreage. These infestations are located in Black Canyon and Dry Canyon on the Westside District, although smaller patches are dispersed across the Forest. On the large, concentrated areas, herbicide applications have not contained the infestation. In 1995, the Ranger District started using introductions of biological control agents to help with the containment. Forest personnel have introduced *Apthona nigriscutis*, *A. flava*, *A. cyparissiae*, and *A. lacertosa* beetles, all of which are foliage and root feeders; *Czwalinae lacertosa* beetles, a root feeder; *Spurgia esulae*, a gall fly that attacks the buds; and *Oberea eryghrocephala* beetle, a root and stem borer. Biological control agents for other species have not been used on the Forest, but counties have introduced them on other species, especially thistles, adjacent to the Forest. Dyer's woad is affected by a natural rust, which has been observed infecting plants on the Forest.

Table 3. 78 Status of Noxious Weeds on the Caribou National Forest, 2001.

Target Species	Scientific Name	Acres Infested	Acres Treated	Treatment Method	State
Dalmation toadflax	*Linaria genistifolia*	4	1	Chemical	ID
Spotted knapweed	*Centaurea maculosa*	140	94	Chemical	ID
Spotted knapweed	*Centaurea maculosa*	N/A	1	Physical	ID
Leafy spurge	*Euphorbia esula*	6,037	74	Chemical	ID
Leafy spurge	*Euphorbia esula*	N/A	610	Biological	ID
Leafy spurge	*Euphorbia esula*	N/A	1,000	Grazing	ID
Leafy spurge	*Euphorbia esula*	380	250	Biological	WY
Leafy spurge	*Euphorbia esula*	N/A	130	Chemical	WY
Diffuse knapweed	*Centaurea diffusa*	1	1	Chemical	ID
Canada thistle	*Cirsium arvense*	11,900	862	Chemical	ID
Canada thistle	*Cirsium arvense*	N/A	90	Biological	ID
Canada thistle	*Cirsium arvense*	2,000	10,045	Chemical	WY
Musk thistle	*Carduus nutans*	50,905	735	Chemical	ID
Musk thistle	*Carduus nutans*	N/A	120	Biological	ID
Musk thistle	*Carduus nutans*	1,000	60	Chemical	WY
Yellow toadflax	*Linaria vulgaris*	3,955	578	Chemical	ID
Yellow toadflax	*Linaria vulgaris*	62	62	Chemical	WY
Whitetop	*Erigeron ramosus*	110	13	Chemical	ID
Henbane	*Hyoscyamus niger*	3,103	18	Chemical	ID
Henbane	*Hyoscyamus niger*	10	5	Chemical	WY
Dyers woad	*Isatis tinctoria*	5,500	1,851	Chemical	ID
Dyers woad	*Isatis tinctoria*	N/A	51	Physical	ID
Dyers woad	*Isatis tinctoria*	100	50	Chemical	WY
Common burdock*	*Arctium minus*	5	1	Chemical	ID
Hounds tongue*	*Cynoglossum officinale*	2	1	Chemical	ID
Poison hemlock	*Conium maculatum*	100	4	Chemical	ID
Bull thistle*	*Cirsium valgare*	200	30	Chemical	ID
Total		**85,514**	**5,933**		

* These plants are not on Idaho's noxious weed list but are of local concern.

In 1999, the Westside District formed a partnership to bring sheep onto the Forest to graze leafy spurge early in the spring when the plants are young. The sheep are also allowed to graze the subsequent regrowth of spurge. This partnership has been extremely successful and the leafy spurge has been drastically reduced in acreage.

In addition to the plants shown above that already occur on the Forest and are being treated, distribution maps in Idaho's Noxious Weeds publication show that the following plants are found in the counties where the Caribou Forest is located, although they have not been found on National Forest System lands:

Common Name	**Scientific Name**
Field Bindweed	*Convolvulus arvensis*
Buffalobur	*Solanum rostratum*
Jointed Goatgrass	*Aegilops cylindrica*
Meadow Knapweed	*Centaurea pratensis*
Russian Knapweed	*Acroptilon repens*
Purple Loosestrife	*Lythrum salicaria*
Perennial Pepperweed	*Lepidium latifolium*
Puncturevine	*Tribulus terrestris*
Perennial Sowthistle	*Sonchus arvensis*
Yellow star thistle	*Centaurea solstitialis*
Scotch thistle	*Onopordum acanthium*

The Forest is covered by two Cooperative Weed Management Areas (CWMAs). The Utah and Idaho CWMA covers the western half of the Forest and the Highlands CWMA covers the eastern side of the Forest. A map is available in the Noxious Weed section of the Project File.

Research Natural Areas

Because management direction will be consistent in all Alternatives, no indicator was developed.

BACKGROUND TO SUBJECT

Research National Areas (RNAs) are part of a national network of ecological areas designed in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. RNAs are for non-manipulative research, observation and study. They also assist in implementing provisions of the National Forest Management Act, 1976.

Site-specific information for individual RNAs can be found in the ***Initial Analysis of the Management Situation, 1999***, the 4063.32 files in the Supervisor's Office which contain Environmental Analysis Reports, and/or the Establishment Records and project files. An objective of the Revised Caribou Land and Resource Management Plan will be to bring all seven RNAs under consistent direction. New direction will include the use of prescribed and natural fire, and the removal of exotic species to maintain objectives of RNAs where appropriate.

The Regional Forester and Intermountain Research Station Director retain final approval for any management activities and uses in RNAs. Decisions regarding actions such as prescribed fire, wild fire control methods, noxious weed control, or specific kinds of research that is limited to non destructive methods will be made by the Regional Forest and the Intermountain Research Station Director in consultation with the Forest Supervisor and District Ranger.

The forest currently has seven established Research Natural Areas; each RNA has unique features representing some of the Forest's diversity. No other areas are being evaluated for RNA status.

HORSE CREEK RNA

The Horse Creek RNA is located near the Idaho-Wyoming boundary on the Soda Springs Ranger District and near the Stump Creek Forest Service administrative site on Horse Creek. It was established on September 21, 1989 and contains about 550 acres (223 ha). This RNA was established with the objective to maintain and preserve the cold spring and several subalpine fir habitat types in as near an undisturbed (by man) condition as possible without the use of practices such as livestock grazing and prescribed burning and without the disruptive effects of wildfire.

Horse Creek RNA provides reference areas for study, baseline areas for measuring long-term ecological changes, and monitoring comparison areas for determining effects of resource management techniques and practices applied to similar ecosystems. Located in an area free of air pollution, but with tension between forests and shrublands, this RNA has relevance for studies of the effects of climatic change.

Specific Management Direction

No surface occupancy is permitted for oil and gas leasing. Light livestock grazing along a narrow corridor on Horse Creek and occasional use on the southern ridgeline boundary is permitted. No prescribed burning is permitted. (This prescribed burning prohibition direction in the Establishment Report amended the Forest Plan for this RNA area). No control of insect & disease activity is permitted unless such activity endangers surrounding forest areas. See page III-25 in the 1985 Forest Plan for specific wildfire direction.

Burton Canyon RNA

Burton Canyon RNA is located on the northern end of the Bear River Range, six miles south of the town of Soda Springs on the Montpelier Ranger District. It was established on March 30, 1988 and contains approximately 1,005 acres (407 ha). The objective for this RNA is to maintain and preserve the terrestrial and aquatic communities in as near an undisturbed (by man) condition as possible without the use of practices such as livestock grazing and prescribed burning and without the disruptive effects of wildfire. Although Douglas-fir, subalpine fir and mountain mahogany types were the reason for considering Burton Canyon as a RNA, examination of the canyon proved it to be very diverse with respect to both its vegetation and its geology. It contains at least five Douglas-fir habitat types, three subalpine fir habitat types, two aspen habitat types, one Bigtooth maple habitat type and extensive areas of mountain mahogany habitat type. One of the Douglas-fir types and two of the subalpine fir types do not occur in any other RNA in southern Idaho.

Specific Management Direction

No livestock grazing is permitted. No prescribed burning is permitted. (This prescribed burning prohibition direction in the Establishment Report amended the Forest Plan for this RNA area). No control of insect & disease activity is permitted unless such activity endangers surrounding forest areas. Annual monitoring of Dyer's Woad is occurring to determine if treatment is necessary or practical. See page III-25 in the 1985 Forest Plan for specific wildfire direction.

Meade Peak RNA

The Meade Peak RNA is located on Snowdrift Mountain in the Preuss Range about 12 miles north of Montpelier, Idaho and 25 miles north of Bear Lake on the Montpelier Ranger District. It was established on March 2, 1988 and contains about 300 acres (121.5 ha). The objective for this RNA is to maintain and preserve the subalpine conditions it represents in

as near an undisturbed (by man) condition as possible without the use of practices such as livestock grazing and prescribed burning and without the disruptive effects of wildfire. It is representative of higher elevation country with a mix of growing conditions and resulting vegetation and animal life that it contains. Growing conditions of climate and soils are harsh, and the vegetation reflects these conditions. Meade Peak RNA provides an area undisturbed by man where relationships between a severe environment and the resulting vegetation can be observed and studied.

Specific Management Direction

No surface occupancy is permitted for oil and gas leasing. Sheep grazing is permitted and will be controlled by herding. No timber cutting or removal is permitted. No control of insect & disease activity is permitted unless such activity endangers surrounding forest areas. See page III-25 in the 1985 Forest Plan for specific wildfire direction.

St. Charles Creek RNA

The St. Charles RNA is located in the Bear River Range on the Montpelier Ranger District, approximately 19 miles southwest of Montpelier, Idaho. It was established on July 18, 1988 and contains about 410 acres (166 ha). The objective of the St. Charles RNA is to maintain and preserve the terrestrial and aquatic communities in as near an undisturbed (by man) condition as possible without the use of practices such as livestock grazing and prescribed burning and without the disruptive effects of wildfire. The RNA provides an opportunity to study the effects on vegetation of rock substrates of differing geologic ages across a fault line that bisects the area. It contains excellent communities of mountain mahogany, both as the climax dominant species and as an understory of Douglas-fir communities. It is the only RNA in Idaho containing certain plant species (*Heuchara nubescens*) and plant communities (*Cerocarpus ledifolius/Leucopoa kingii*). It is representative of south slope vegetation of lower elevations of the Bear River Range.

Specific Management Direction

No surface occupancy is permitted for oil and gas leasing. This RNA is closed to general livestock grazing. Some minimal grazing is permitted along the southern boundary at a level that will not appreciably affect vegetation. Prescribed burning is not permitted. (This prescribed burning prohibition direction in the Establishment Report amended the Forest Plan for this RNA area). No control of insect & disease activity is permitted unless such activity endangers surrounding forest areas. See page III-25 in the 1985 Forest Plan for specific wildfire direction.

Gunsight Peak RNA

Gunsight Peak RNA is located about 56 miles south of Pocatello, Idaho in Utah near the Idaho-Utah boundary on the Malad (Westside) Ranger District near Elgrove and Water Canyons. It was established on April 4, 1990 and contains about 550 acres (223 ha). The objective of this RNA is to maintain and preserve upper elevation subalpine vegetation in as

near an undisturbed (by man) condition as possible without the use of practices such as livestock grazing and prescribed burning and without the disruptive effects of wildfire. The RNA provides reference areas for the study of undisturbed vegetation and baseline areas for determining and measuring effects of management techniques and practices applied to similar ecosystems.

The Gunsight Peak RNA was selected as a relatively undisturbed example of upper elevation subalpine vegetation on soils from Paleozoic marine carbonates in the southwest part of the Forest. It contains diverse vegetation made up of plant associations of Douglas-fir, limber pine, aspen, mountain mahogany, Ostermont sagebrush and low sagebrush.

Specific Management Direction

No livestock grazing is permitted. Prescribed burning is not permitted. (This prescribed burning prohibition direction in the Establishment Report amended the Forest Plan for this RNA area). No control of insect & disease activity is permitted unless such activity endangers surrounding forest areas. See page III-25 in the 1985 Forest Plan for specific wildfire direction.

GIBSON JACK RNA

Gibson Jack is the largest RNA on the Forest and contains about 2,200 acres (891 ha). It is located six miles south of Pocatello, Idaho on the Westside Ranger District. It was established on the Forest on April 1, 1982. The objective is to maintain and preserve stands of Bigtooth maple and shrub types along with other features such as beaver dams and ponds within the RNA boundary. The RNA represents an area that has not been grazed by livestock for over 75 years. In a region where it is difficult to find ungrazed areas, the Gibson Jack RNA is significant as a baseline monitoring area. In addition, the RNA is used by faculty and students at Idaho State University for research and educational purposes.

Specific Management Direction

No livestock grazing is permitted. See page III-25 in the 1985 Forest Plan for specific wildfire and fuel treatment direction.

WEST FORK MINK CREEK RNA

The West Fork Mink Creek RNA is a 640-acre (259 ha) area and was established on May 8, 1973. It was the first RNA established on the Forest. This RNA is located seven miles south of Pocatello, Idaho about midway in the West Mink Creek Drainage of the Westside Ranger District. The objective for this RNA is to maintain and preserve in a virgin or unmodified condition so as to typify for research and educational purposes the Douglas-fir/Aspen and sagebrush-grass communities of the region. It offers unique opportunities to study various Douglas-fir and sage-grass plant communities in a relatively undisturbed state. Its easy access allows use by faculty and students at Idaho State University for research and educational purposes.

Specific Management Direction

No livestock grazing is permitted. See page III-25 in the 1985 Forest Plan for specific wildfire and fuel treatment direction.

Other Resources

Roads

Because management direction on roads will be consistent in all Alternatives, no indicator was developed.

BACKGROUND TO SUBJECT

A road is a motor vehicle route more than fifty inches wide, unless designated and managed as a trail. Historically, these roads were developed to provide access for local ranchers and loggers. More recently, timber and mineral interests have resulted in new and/or improved access. As access has improved and local population pressures have increased, additional roads have been pioneered for hunting, fuel wood gathering, and other recreational needs. Over time, an extensive transportation system has evolved. Some of the increases in the Forest road system are due to better inventories and classification of existing roads. Today, recreation is the largest single use of National Forest System roads.

Roads can have both beneficial and negative effects. Roads provide access for multiple uses, access to private lands, and firebreaks, and if properly constructed, roads 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 pathogens, some recreational experiences, water quality and chemical contamination, soil productivity and biodiversity.

Forest roads are authorized primarily for the administration, protection, and use of National Forest System lands. They are essential in providing access to and through the Forest. An extensive transportation system is in place and provides necessary access to the Forest. Reconstruction and maintenance of the existing road system is done to maintain the system, as necessary, to meet access, safety, and environmental needs. New road construction will also be necessary to meet access needs in the future. Unneeded roads will be identified and scheduled for decommissioning.

In January 2001, the Chief of the Forest Service approved a new road management policy that requires the use of a science-based roads analysis process to analyze the Forest transportation system. The analysis identifies the minimum transportation system needed for forest management, yet minimizes or reverses the environmental impacts often caused by roads. The new policy is aimed at providing managers with tools to make better and more informed decisions about where, when, and if new roads should be constructed, whether to upgrade forest roads as appropriate to meet changing uses, local community access needs and growing recreational demands, and to help identify sustainable funding sources for maintaining the Forest's road system. It relies on the Forest Service report entitled "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System"

(1999). Roads analysis is an integrated, ecological, social, and economic science-based approach to transportation planning that addresses existing and future road management options. The Caribou Road Analysis Report is in the Project File and available upon request.

ROAD MANAGEMENT

Roads management is an important aspect of Forest management. Most of the administrative, commercial and public travel on the Forest occurs on roads. The Forest transportation system inventory shows 1,668 miles of roads under Forest Service jurisdiction, including a variety of road standards, from two-track roads up to two-lane, paved highways. Roads under municipal, county, or state jurisdiction or private roads that provide access to the Forest complete the transportation network.

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 the higher volume of traffic they carry. Collector roads disperse traffic from arterials to large forest areas, such as watersheds. Local roads are used to access specific areas or sites and are usually short roads of a lower standard of construction.

Table 3. 79. Miles of Road by Functional Classification on Inventoried Classified Roads (USFS jurisdiction).

Functional Class	Miles of Road
Arterial	78.3
Collector	219.4
Local	1,370.6
TOTAL	1,668.3

Source: USDA-FS, INFRA database

A road might be classified, unclassified, or temporary. Classified roads are those that are wholly or partially within or adjacent to National Forest System lands and are determined to be needed for long-term motor vehicle access, including state, county, and privately owned roads, National Forest System roads, and other roads Temporary roads are authorized by contract, permit, lease, or emergency operation, not intended to be a part of the National Forest transportation system and not necessary for long-term resource management.

Unclassified roads on National Forest System lands that are not managed as part of the forest transportation system include 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 termination of the authorization. In the past, these unclassified roads were termed “temporary,” “pioneer,” “ghost,” “ways,” and “two-track” roads. Some of these roads were added to the road inventory during the transportation system update in the early 1980s. Many more of these unclassified roads exist but have not been inventoried. Future roads analyses at the

watershed or project level will identify all roads within the analysis area and make recommendations as to their future management.

Traffic service levels represent the significant traffic characteristics and operating conditions for a road from Level A (most efficient and free-flowing to Level D, (single purpose with low value). Road maintenance levels prescribe the upkeep and restoration work necessary to retain a desired service levels.

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. Levels 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. Level 5 is a road with a paved, smooth surface. The following tables show Miles of Road by Traffic Service Level and Objective Maintenance Level:

Table 3. 80 Miles of Road by Traffic Service Level.

Traffic Service Level	Miles of Road
TSL A	0
TSL B	72.7
TSL C	295.3
TSL D	1,300.3
TOTAL	**1,668.3**

Source: USDA-FS INFRA database

Table 3. 81 Miles by Objective Maintenance Level.

Objective Maintenance Level	Miles of Road
OML 1	732.3
OML 2	610.1
OML 3	241.7
OML 4	72.1
OML 5	12.1
TOTAL	**1,668.3**

Source: USDA-FS INFRA database

The 1985 Forest Plan included an estimate of the number of miles of new road construction and reconstruction planned on the Forest over the planning period (10-15 years). Because of reductions in the timber sale program and lower than expected appropriations for capital investments, the miles of new construction and reconstruction is less than planned. The 1985 Forest Plan also contained direction of "no net increase in open road densities." To comply with this direction, most newly constructed single-purpose roads for timber activities are being closed after timber management activities are completed. Existing roads that are being reconstructed are usually left open. Road management activities, such as construction, reconstruction, and obliteration were done to meet access needs, improve water quality, provide wildlife security areas, and create an efficient transportation system.

Mining activity also required road management activities. Temporary mineral exploration roads are usually closed to the public during exploration activities and then closed to motorized vehicles when not in use. Roads constructed for minerals development are constructed as part of the mine development plan and are usually closed to the public for safety reasons. Many of these roads are consumed by mine development or are obliterated during mine reclamation activities. Long-term management of these roads is determined on site-specific analysis and long-term needs.

Road mileages displayed in this section do not match those used as indicators for Issue 1: Recreation, Access and Scenery Management for several reasons. The roads used in the Roads Analysis are those with an objective maintenance level of 3, 4, or 5 as shown in the Forest's INFRA database. The road network used in the Plan analysis includes low standard roads that may not be on the Forest's transportation system inventory. The analysis mileages also include motorized trails. In many cases it is difficult to know when the road ends and trail begins and this break-point is different in the two route inventories. These discrepancies will be dealt with during travel planning and/or site specific Roads Analyses. In addition, the road mileages shown in the Analysis of the Management Situation are different still. This is because those totals included the Curlew National Grassland and they do not reflect updates to the road inventory over the past four years.

ROAD MAINTENANCE

As a result of decreased and inadequate funding, the condition of many roads on the Forest has fallen below levels necessary for safety, for resource protection, and to efficiently support traffic volumes being carried. The Forest has cooperative maintenance agreements with all of the adjacent counties to improve the efficiencies of scarce maintenance funds. These agreements provide some maintenance of Forest Service roads, but generally they are used to help maintain roads that provide access to the Forest.

Road maintenance budgets are below what is needed to maintain the Forest's transportation system. At the same time traffic volumes on Forest roads have increased. Many roads have not been maintained to the levels prescribed in management objectives. Annual accomplishment reporting indicates that the Forest's road maintenance program is only maintaining 25 percent of the Forest's transportation system to standard. Road condition surveys completed between 1998 and 2000 estimate the cost of annual and deferred road maintenance for the Forest's road system. Appropriated road maintenance funding in only 15 percent of that estimated for annual maintenance. In addition, an estimated $4.5 million will be needed to reduce the deferred maintenance backlog. Current road maintenance activities have concentrated on the higher standard maintenance level 3-5 roads to improve drainage, to provide surface blading, to add surface material to improve user comfort and reduce impacts, and to improve public safety. Many local roads are primitive, poorly located, and difficult or impossible to maintain. They continue to deteriorate, cause resource damage and are becoming safety hazards. Many need to be reconstructed.

The Forest Service is pursuing additional funding outside of normal Forest Service appropriations. They have identified the Federal Highway Trust Fund (Federal Gas Tax) as a potential source of additional funding and are working with the Federal Highway

Administration (FHWA) in this effort. The Forest Service is developing regulations to implement this strategy if and when they are allowed to compete for these funds in the next six-year Transportation Bill beginning in 2004. The Forest Service has declared it is a public road agency and has asked individual forests to identify a potential Public Forest Service Road (PFSR) system. For the Caribou NF this potential PFSR system includes most of the higher standard maintenance level 3-5 roads, except for campground and administrative site roads. If the Forest Service were successful in this effort, the additional funding would significantly increase the amount of deferred maintenance and reconstruction accomplished on the Forest's roads.

Non-system travelways are usually not necessary for administration or access. Many of these routes are old timber, range or mining roads that may or may not have been altered to eliminate vehicle traffic. Others have been created by unapproved recreational use. Because these travelways appear on the landscape as a road, human use is causing significant resource damage. A critical need exists to monitor these non-system travelways as to their use and condition, and if appropriate, close them as soon as funding is available. Public comments indicate many of these travelways are of interest and value to some Forest users, who want them kept open, or re-opened, for motorized and mechanized recreation and access. Others want them closed to protect roadless areas, wildlife and watershed values. As Forest personnel complete the Roads Analysis for the forest, particularly at the watershed and site-specific project level, these routes will be located and inventoried, and recommendations will be made for future management.

RS 2477 Roads

Revised Statute (RS) 2477 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 statute states that is a road qualifies as a "public way" under RS2477, it must be protected as a valid existing right (Targhee NF Appeal Decision, 2002). RS 2477 assertions need to be made by a public road agency, such as a county, with the burden of proof falling to the agency asserting the claim. The Forest Service has no regulatory mechanism by which it can authoritatively recognize public roads under RS 2477 at this time. Only a court of competent jurisdiction can conclusively make such a determination.

The determination of whether a public right-of-way currently exists across National Forest lands or other types of lands under RS 2477 is a question of fact. The question of fact is dependent upon actions that occurred and whether abandonment occurred. The Forest has requested local counties to provide a list of roads on the Forest that they would assert as RS 2477. While the decision on individual roads will not be made as part of the Forest Plan revision, this request was made to assess the overall scope of assertions that might be made. In the mean time, the Forest will not make any road management decisions to decommission any road that has a RS 2477 assertion until the claim has been resolved.

Other Resources

Threatened, Endangered, and Sensitive (TES) Plant Species

Scale of Analysis:
Forest-wide
Range-wide

Issue Statement:

Activities, such as livestock grazing and trampling, fire (suppression, wild and controlled), invasive species (spread and control), roads (building and maintenance) and recreation activities (motorized and non-motorized) can adversely impact plant species at risk either directly or indirectly. While this was not an issue to drive alternatives, effects must be indicated for each alternative.

Indicator:

- **Viability risk analysis for plant TES (includes proposed sensitive) based on known occurrences and habitat outcomes for each alternative.**

  Baseline Indicator: Moderate risk

BACKGROUND TO SUBJECT

The affected areas for direct and indirect effects on TES plants are the lands administered by the Forest. Some management areas may be highlighted, due to the significance of their contributions to Forest-wide populations. This is especially the case with endemic plant populations and plants on the fringe of their natural range. The affected areas for cumulative effects on TES plants will include a discussion of the distribution for individual plant species.

Forest Service botanists compiled existing information of rare or potentially rare plant species from the Intermountain Region's Sensitive Species List (current and proposed, 2000) and from lists maintained by the Natural Heritage and Conservation Data Center network in Wyoming, Utah, and Idaho.

The Forest provides a wide variety of diverse habitats for numerous vascular and non-vascular[46] plant species. Species vary greatly in abundance and distribution, from very abundant and widespread to extremely rare and locally distributed and all combinations in between. This section presents a more detailed description of the rarest elements of the flora: Threatened, Endangered, proposed, and Forest Service Region 4 sensitive species.

The review monitoring data in the 1985 Caribou Forest Plan for the Initial Analysis of the Management Situation (AMS, 1999) found that the 1985 Forest Plan lacks specific guidelines for Sensitive Species, including plants and fish. Based on this there is a need to develop and incorporate standards and guidelines for all Sensitive Species.

[46] **Nonvascular plant** – an artificial reference to bryophytes (mosses and liverworts), lichens, and fungi. Currently no known rare nonvascular plants occur on the Caribou NF.

Activities, such as livestock grazing and trampling, fire (suppression, wild and controlled), invasive species (spread and control), roads (building and maintenance) and recreation activities (motorized and non-motorized) can adversely impact plant species at risk either directly or indirectly. Activities, in some cases, can be beneficial if the activity improves the ecological condition of the habitat or reduces the likelihood of noxious weeds will invade habitat or populations.

FEDERALLY LISTED PLANTS

No complete floristic inventory of plant species occurring on the Caribou National Forest has been conducted to date, and survey work for rare species has been sporadic. Formal floristic survey work has primarily focused on specific areas, such as Research Natural Areas and the Bear River Range; species, such as Ute ladies'-tresses (*Spiranthes diluvialis*) and Idaho Sedge (*Carex idahoa*); or in areas of unique plant communities, such as Bloomington Lake and Elk Valley Marsh. As a result, information is limited to determine the risk to TES plant species occurring within the planning area.

No endangered plant species are known to occur on the Forest. Potentially suitable habitat for Ute ladies'-tresses, a threatened plant, has been surveyed for populations, but none have been found to date. Four plant species on the Forest are on the Intermountain Region's Sensitive Species List. Of the species proposed as sensitive by the Regional Forester, and suspected to occur on the forest, or tracked as Species of Special Concern by State Natural Heritage and Conservation Data Center Networks (primarily Idaho), six were chosen for this analysis, based on available information indicating a viability concern within the planning area (See Appendix B).

THREATENED: UTE LADIES'-TRESSES (*Spiranthes diluvialis*)

In October 1996, the U.S. Fish and Wildlife Service (USFWS) added the Ute ladies'-tresses to the list of Threatened and Endangered Species that may occur on the Forest. Since that time, numerous surveys have been conducted on the Forest and in adjacent areas (Feltis, 1997, 1997b; Moseley 1997a, 1997b, 1997c, 1997d; Varga, 1999a, 1999b; Atwood, 1997; Rey-Vizgirdas, 1997; Thompson, 1997; USFS, 2000). To date, no populations of Ute ladies'-tresses have been discovered on the Forest. The U.S. Fish and Wildlife Service made a decision (2002) to remove Ute ladies'-tresses from counties in Idaho where there are no current or historical populations of the species and to list the species by Forest Service Districts under the same conditions. The U.S. Fish and Wildlife Service has requested that the Forest to consider the species when conducting activities in areas with potentially suitable habitat.

Ute ladies'-tresses orchid was named in 1984 and federally listed as Threatened on January 17, 1992 under the ESA. The species occurs near the base of the eastern slope of the Rocky Mountains in southeast Wyoming and north-central and central Colorado; in the upper Colorado River Basin; and along the Wasatch Front and westward in the eastern Great Basin in north-central and western Utah and extreme eastern Nevada (historical). In 1994, the

range was expanded north by discoveries in central Wyoming and western Montana, and in 1996, along the South Fork of the Snake River in southeast Idaho. In 1997 the range was extended to include north-central Washington.

Ute ladies'-tresses is endemic to moist soils at relatively low-elevation riparian, spring, and lakeside wetland meadows. The elevation range of known habitat is 1,500 feet in north-central Washington to 7,000 feet in Utah. 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. Ute ladies'-tresses appears to be well adapted to disturbances caused by water movement through flood plains over time. It often grows on point bars and other recently created riparian habitat. The orchid appears to require permanent sub-irrigation, with the water table holding steady throughout the growing season and into late summer and early autumn. Ute ladies'-tresses occurs primarily in areas where the vegetation is relatively open and not very dense.

Habitat that would be considered suitable for Ute ladies'-tresses is limited on the forest, based on topography, elevation, vegetation, stream types, and other factors. Areas identified as potentially suitable habitat have been surveyed at least once during the plant's flowering period. Rivers and streams in the valley bottoms in the surrounding area of the forest are more likely to contain habitat, such as the Bear River. There are no river systems similar to the South Fork of the Snake River on the Forest.

The Forest will continue to consider potentially suitable habitat for Ute ladies'-tresses that may be impacted by proposed and ongoing activities. Because no populations have been found and no habitat has been identified that would be critical to its recovery, there are no measurable risks to Ute ladies'-tresses that would vary by alternative. Ute ladies'-tresses will not be analyzed further in this EIS.

CANDIDATE SPECIES: SLICK-SPOT PEPPERGRASS (*Lepedium papilliferum*)

An historical collection of slick spot peppergrass from 1949 is documented for the Forest, but it is known to be a southwest Idaho endemic. Based on this historical collection, the species was added to the Intermountain Region's Sensitive Species List for the Forest in 1994. This species is identified as a Candidate species in the USFWS 1999 review of plant and animal species proposed for listing (***Federal Register*** 64:57533-57547).

In the process of reviewing the species, the USFWS found that the historical collection on the Forest has not been confirmed and is not considered to exist within preferred habitat for slick spot peppergrass (Wood 2000). The historical collection is believed to be either an identification error or to have an erroneous data label (Mancuso, 2000). In addition, the USFWS considers the entire Forest to be well outside the known range of the species. The species has been recommended for deletion from the Intermountain Region's Sensitive Species List for the Forest and will not be analyzed further in this EIS.

SENSITIVE PLANT SPECIES (CURRENT AND PROPOSED)

The initial Intermountain Region Sensitive Plant Species List was published in 1988 and later updated in 1995. A revision of the list is expected to be completed soon, which may drop some species now being tracked as sensitive and add others considered "at risk" within the planning area.

Potential impacts of proposed management activities on Sensitive Species and their habitats are reviewed through biological evaluations. The goals of biological evaluations are to insure Sensitive Species viability and to preclude trends toward endangerment that would result in the need for federal listing. Where appropriate, mitigation measures are recommended to reduce impacts to Sensitive Species and their habitats.

Table 3.82 displays a list of the species chosen for this analysis showing: rarity status, distribution, area of known occurrences by district, potential habitat on Forest by subsection, and the general suitable habitat for the species.

The current population trend for all of the sensitive plant species (current and proposed) on the Forest is unknown at this time.

Table 3. 82. List of Plant Species for this Analysis and Rarity Status, Distribution, Area of Known Occurrences by District, Potential Habitat on Forest by Subsection, and the General Suitable Habitat for the Species.

Species	Status[1]	Distribution (Range-wide)[2]	Known Occurrences on Forest	Potential and Known Habitat on Forest (By Subsection)	Suitable Habitat (General)
Sensitive					
Starveling milkvetch (*Astragalus jejunus* var. *jejunus*)	G3T3/S2	Regional endemic (WY, ID, UT)	Montpelier District	Preuss Ridge and Hills	Unique (Twin Creek Limestone)
Slick spot peppergrass[3] (*Lepedim papilliferum*)	G2/S1 Candidate	SW Idaho Endemic	None	Not suspected to occur	
Payson's bladderpod (*Lesquerella paysonii*)	G3/S1	Local endemic	Soda Springs District	Caribou Range Overthrust Mtns	High elevation; Calcareous gravel and rock
Cache penstemon (*Penstemon compactus*)	G2G3/S2	Local endemic	Montpelier District	Cache Front and Bear River Mtns	Ridgelines and summits, carbonate substrate
Other Species of Viability Concern **Proposed Sensitive**					
Green Spleenwort (*Asplenium viride*)	G4/S1	Circumboreal-sparsely distributed	Montpelier District	Cache Front, Bear River Mtns and Caribou Range Overthrust Mtns.	Relatively high elevation rock crevices
Idaho Sedge (*Carex parryana* ssp. *idahoa*)	G2/S1	Regional endemic (MT and ID)	Soda Springs District	Webster Ridges and Valleys & Caribou Range Overthrust Mtns.	Riparian and wetlands
Uinta Basin Crypthantha (*Cryptantha breviflora*)	G4/S2	Regional endemic (CO, UT, ID)	Montpelier District	Preuss Ridge and Hills	Twin Creek Limestone
Wasatch bladderpod (*Lesquerella multiceps*)	G3/S1	Local endemic (ID, WY, UT)	Montpelier District	Cache Front, Bear River Mtns & Caribou Range Overthrust Mtns.	High elevation; Calcareous gravel and rock
Rydberg's musineon (*Musineon lineare*)	G2G3/S1	Local endemic	Montpelier District	Cache Front and Bear River Mtns	High elevation; Rock crevices and ledges
Red Glasswort (*Salicornia rubra*)	G4/S2	Peripheral	Montpelier District	Preuss Ridge and Hills and possible others.	Moist saline or alkaline soil

1 Status = Global and state (Idaho) ranking as assigned by Natural Heritage and Conservation Data Center Network. The system is a one-through-five ranking system, ranging from species globally rare (G1-G3) to those rare in Idaho (G4-G5 with state ranks of S1 or S2).

2 Distribution= Disjunct, local endemic (< 100 square miles), regional endemic (distribution 100-10,000 square miles), peripheral, or circumboreal (found in boreal habitat in more then one continent)

3 See discussion above concerning slick spot peppergrass.

Wild and Scenic Rivers

Analysis Scale: Forest-wide

Because Forest Plan Wild & Scenic River acres do not change among Alternatives, and management direction will be consistent in all Alternatives, no Wild & Scenic River indicator was developed.

BACKGROUND TO SUBJECT

The National Wild & Scenic Rivers Act is considered an important piece of conservation law enacted by Congress to address the need for a national system of river protection. The Act (Public Law 90-542; 16 U.S.C. 1271-1287) was enacted on October 2, 1968. As an outgrowth of a national conservation agenda in the 1950s and 1960s, the Wild & Scenic Rivers Act was in response to the dams, diversions, and water resource development projects that occurred on America's rivers between the 1930s and 1960s. The Act concluded that selected rivers should be preserved in a free-flowing condition and be protected for the benefit and enjoyment of present and future generations. Since 1968, it has been amended many times, primarily to designate additional rivers and authorize additional rivers for study for possible inclusion.

As of April 30, 1997, some 154 river segments, comprising 10,815 miles (17,405 km), have been afforded protection in the National System. These nationally recognized rivers comprise some of the nation's greatest diversity of recreational, natural, and cultural resources, offering great scientific study value and scenic beauty.

The Wild & Scenic Rivers Act seeks to maintain and enhance a river's current natural condition and provide for public use consistent with retaining identified outstandingly remarkable values. Designation affords certain legal protection from development: no new dams can be constructed nor are federally assisted water resource development projects permitted which might adversely affect the designated river values. Where private lands are involved, the federal managing agency works with local governments and owners to develop protective measures.

Rivers[47] can be designated into the National System by Act of Congress or by the Secretary of Interior, if the river has first been designated into a valid state river protective system by state law, and the appropriate governor has applied for a Wild & Scenic River designation. To be eligible for designation, a river must be free-flowing[48] and contain at least one

47 The Act defines a **river** as "a flowing body of water or estuary, or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes.

48 **Free-flowing** is not to be confused with "naturally flowing" which means flowing without any man-made up-or down-stream manipulations. The presence of impoundments (dams, diversion works, straightening, rip-rapping or other minor structures or modifications of the waterway) above and/or below a river segment does not automatically disqualify the segment as a potential addition to the National System.

"Outstandingly Remarkable Value," such as scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar value such as botanical, hydrological, paleontological, scientific, or heritage values.

ELIGIBILITY

The Forest Service is required, through planning regulations and processes, to assess rivers under its management jurisdiction and determine a river eligible or not eligible for further study under the Wild & Scenic Rivers Act by applying standardized criteria through a documented evaluation process. River areas[49] that are found to be eligible for further study under the Act are given a tentative classification as wild,[50] scenic[51] or recreational,[52] based on the development of shoreline, watercourse, and access. Proposed boundaries and/or river areas and protective management requirements are developed at that time for eligible rivers. For river segments on federal lands determined to be eligible under Section 5(d)(1) of the Act, management protection is in effect until such time as a "suitability"[53] evaluation and subsequent decision is made. **Suitability of eligible sites has not been completed and is not part of this analysis.**

Protective management of federal lands in the river area begins at the time the river segment(s) has been found eligible. Specific management prescriptions for eligible river segments provide protection, pending a suitability determination, in the following ways:

Free-flowing values. The free-flowing characteristics of eligible river segments cannot be modified to allow stream impoundments, diversions, channelization, and/or rip-rapping to the extent authorized under law.

River-related values. Each segment is managed to protect outstandingly remarkable values (subject to valid existing rights) and, to the extent practicable, such values are enhanced.

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49 **River areas** include the entire length of an eligible, study or designated river and its adjacent lands, generally 320 acres (130 ha) per river mile, one-quarter of a mile on each side of the river measured from the ordinary high water mark. A **river segment** is a portion of the river area which has been delineated for evaluation and planning purposes.

50 **Wild river** areas are those rivers, or sections of rivers, that are free of impoundments, generally inaccessible except by trail (no roads), with watersheds or shorelines essentially primitive, having unpolluted waters.

51 **Scenic river** areas are those rivers or sections of rivers that are free of impoundments, having shorelines or watersheds largely primitive and shorelines largely undeveloped, but accessible in places by roads (i.e., roads may cross but generally not parallel the river). These rivers are usually more developed than wild and less developed than recreational. This classification may or may not include scenery as an outstandingly remarkable value.

52 **Recreational river** areas are those rivers or sections of rivers that are readily accessible by road or railroad, may have some development along the shoreline, and may have had some impoundment or diversion in the past. This classification, however, does not imply that recreation is an outstandingly remarkable value, nor that the segment must be managed or developed for recreational activities.

53 **Suitability** represents an assessment or determination as to whether the eligible river segment(s) should be recommended for inclusion in the National System by Congress. The Act requires the appropriate Secretary prepare a report on the suitability or non-suitability of the river.

Classification Impacts. Management and development of the eligible river and its corridor cannot be modified, subject to valid existing rights, to the degree that its eligibility or tentative classification would be affected, (that is, its tentative river area classification cannot be changed from wild to scenic, or from scenic to recreational).

Section 5(d) of the Act requires that "in all planning for the use and development of water and related land resources, consideration shall be given by all federal agencies involved to potential wild, scenic and recreational areas." It further requires that the "Secretary of the Interior shall make specific studies and investigations to determine which additional wild, scenic, and recreational river areas . . . shall be evaluated in planning reports by all federal agencies as potential alternative uses of water and related land resources involved."

A Wild & Scenic River Eligibility Review was not fully completed as part of the 1985 Forest Plan. In October 1997, an interdisciplinary process was established to review more than two hundred streams on the Forest for possible Wild & Scenic River eligibility (See Wild and Scenic River Eligibility Study, 1998, for a full review and discussion).

The scope of the eligibility evaluation was defined by watershed and Forest boundaries. Twenty-six watersheds are represented on the Forest.

For the initial Wild & Scenic River eligibility screen, three independent processes were established. A public involvement process was initiated to provide the public an opportunity to nominate streams or stream segments on the Forest for possible eligibility. An inter-disciplinary team at each Ranger District conducted an initial screen and assessed resource values (scenic, recreational, geologic, fish, wildlife, prehistoric, historic, ecological or other value) for each stream on the District for potential outstandingly remarkable values. Results of the preliminary findings by each District review were documented. At the same time, Supervisor Office resource specialists reviewed all streams on the Forest for potential outstandingly remarkable values using the same criteria with a focus on their resource program area. For example, the wildlife biologist reviewed all 200+ streams assessing wildlife values for each stream. Preliminary findings of the forest-wide review were documented for each resource area.

As a result of these three independent processes, sixty-eight streams were identified with ***potentially*** outstandingly remarkable values out of the more than two hundred streams on the Forest. In February 1998, district personnel and forest resource specialists met in an interdisciplinary setting to review and assess these sixty-eight streams for final eligibility determination. All sixty-eight streams were considered to be "free-flowing" at this point in the process. Streams identified as having no "outstandingly remarkable value" by the public and both independent forest reviews were documented and dropped from further evaluation.

Potentially Outstandingly Remarkable Value(s) identified for each of the sixty-eight streams were reassessed. If a "***potential***" outstandingly remarkable value was determined to be truly outstandingly remarkable, the ID Team next assessed the "free-flowing" criteria.

Table 3. 83. Criteria Used to Determine Outstandingly Remarkable (OR) Values

Outstandingly Remarkable Value(s)	Criteria Used
Free-Flowing	Number, size, location of impoundments or diversions; straightening of channel obvious; rip-rapping present; riverine in appearance; and OR directly relates to river; contributes to river's functioning ecosystem; owes its existence and location to the river.
Recreation	Length of season, diversity of use, experience quality, access, level of use, associated opportunities, attraction, sites and facilities
Scenic	Diversity of view, special features, season variations, and cultural modifications
Fish	Habitat diversity, diversity of species, value of species, natural reproduction potential
Wildlife	Habitat diversity, diversity of species
Prehistoric	Significance, current uses, number of cultures represented, site integrity, education or interpretation opportunities, listing/eligibility for National Register of Historic Places
Historic	Significance, site integrity, education or interpretation opportunities, listing/eligibility for National Register of Historic Places
Geologic	Feature abundance, diversity of features, education or scientific value
Ecological	Species diversity, ecological function, rare communities, educational, or scientific value

In addition, each stream and its identified "potential" outstandingly remarkable value(s) were assessed in terms of regional and national significance.

STREAMS ON THE CARIBOU

Three streams on the Forest were identified as having "potential" outstandingly remarkable values: Weston Creek, Elk Valley Marsh and St. Charles Creek. A site description of the two eligible sites can be found in 1998 Wild & Scenic Rivers Eligibility Study on file in the Supervisor's Office.

WESTON CREEK

The ID Team assessed 2.1 miles (3.4 km) of Weston Creek. This stream segment met eligibility criteria for outstandingly remarkable "prehistoric" values. The stream did not meet free-flowing criteria and was determined to be not eligible for further study under the Wild & Scenic Rivers Act.

ELK VALLEY MARSH

Elk Valley Marsh, a 200-acre (81 ha) wetland complex on Spring Creek near Montpelier, Idaho, met eligibility criteria for outstandingly remarkable "ecological" values. The site met free-flowing criteria and was determined to be eligible for further study under the Wild &

Scenic Rivers Act. Surrounding land uses include domestic livestock grazing, recreation, and wildlife habitat.

Elk Valley Marsh is ecologically unique, because of its large size and high elevation at 7,500 feet. It is scientifically interesting from the standpoint of plant and animal species and wetland ecology. It is important to wildlife, especially waterfowl, in an otherwise semi-arid region. Because of its rarity, unaltered natural condition and threats to its existence, it is considered a rare ecosystem. It is one of three relatively large marshes in Idaho, including Kanisku Marsh at 2,500 feet elevation in the Idaho Panhandle National Forest and Lily Marsh at 5,300 feet elevation in Ponderosa State Park near McCall, Idaho.

ST. CHARLES CREEK

The ID Team assessed 8.6 miles of St. Charles Creek. A 6.3-mile (10.1 km) segment of the stream, from its confluence with Snowslide Creek downstream to the boundary of a patented mining claim just inside the Forest boundary near Montpelier, Idaho, met eligibility criteria for outstandingly remarkable "fisheries" values. The stream segment met free-flowing criteria and was determined to be eligible for further study under the Wild & Scenic Rivers Act. Surrounding land uses include developed and dispersed recreation, wildlife habitat, and livestock grazing.

The one-quarter mile river corridor includes three developed campgrounds, Porcupine, St. Charles and Cloverleaf; two dispersed recreation overflow areas, North Fork and Davis; two motorized trails, Davis Canyon Trail and North Fork St. Charles; and two non-motorized trails, Middle Fork St. Charles and the Midland Trail. Minnetonka Cave, one of only two caves on National Forest System lands that offer guided tours, lies just outside the river corridor and attracts more than 20,000 visitors annually to the area. Several old mining sites and the St. Charles Research Natural Area are within the river corridor.

St. Charles Creek is the largest of three tributaries to Bear Lake, which have historically supported populations of naturally spawning Bear Lake cutthroat trout, a unique population of Bonneville cutthroat trout. St. Charles Creek is one of very few streams, which retains any connectivity to Bear Lake. The Bear Lake cutthroat trout appears to be a relatively pure, genetic, lacustrine form of the Bear River Bonneville cutthroat trout. The early life history of the Bear Lake cutthroat trout is relatively unknown. Neilson and Lentsch (1988) believe juveniles enter Bear Lake as two-year olds during spring run-off, although evidence suggests a limited fall out-migration.

The stream provides spawning and rearing habitat for both adult and juvenile cutthroat trout. In the higher reaches of the stream inside Forest boundaries, the stream is less sinuous and flows through forested riparian zones and coniferous forests. The majority of critical habitat for older fish occurs in these habitat areas. The stream provides limited recruitment to Bear Lake, because of downstream fish loss to irrigation diversions on private land. During drought years the ability of fish to migrate into St. Charles Creek is severely limited as a result of lowered water levels in Bear Lake. In an effort to maintain the population, Idaho Fish and Game trap a large number of spawning cutthroat, and strip and use eggs at the Mantua Hatchery for rearing and reintroduction into Bear Lake.

Management direction, including standards and guidelines that will maintain or enhance the outstandingly remarkable ecological value of Elk Valley Marsh and the outstandingly remarkable fisheries value for St. Charles Creek, would be applied consistently in each alternative, including Alternative 1 (No Action) in the Forest Plan revision.

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