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Ashley National Forest Existing Conditions and Trends Report

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1. Introduction

This section provides an overview of the Forest Service planning process. It also describes the purpose and content of this report and explains how it is to be used during Forest-level planning. Subsequent chapters will summarize an internal evaluation of our current Forest Plan and recommend topics to be addressed in the upcoming Forest Plan revision. The findings and recommendations contained in this report are preliminary, and the public will be invited to comment on them.

The Forest Planning Process

With passage of the National Forest Management Act (NFMA) of 1976, each National Forest and Grassland was required to develop a Land and Resource Management Plan. Usually referred to simply as Forest Plans, these documents were intended to guide management activities over a 10-15 year period. Regulations describing how to prepare Forest plans were finalized in 1982, and most Forests and Grasslands completed their first plans 3-5 years later. The Ashley's Plan was approved in 1986.

These first-generation Forest plans set goals and objectives for specific program areas, such as range, wildlife, fisheries, timber, and watershed. They also identified standards and guidelines that must be met when designing projects, and predicted the outputs (for example, board feet of timber, animal unit months of grazing, and recreation visitor days) that would result from projects and activities. Finally, they specified a series of monitoring activities that each Forest was to conduct. The emphasis in these plans tended to be on what outputs could be produced from lands in the planning area, and how potential impacts of various activities could be minimized or avoided.

Since the 1982 Planning Rule, new planning models have been proposed. In 1997 an independent, interdisciplinary review team known as the Committee of Scientists was convened by the Secretary of Agriculture in 1997. The Committee was asked to evaluate the Forest Service's planning process. Their findings were published in 1999 under the title *Sustaining the People's Lands: Recommendations for Stewardship of the National Forests and Grasslands into the Next Century*. Some key points from this report were as follows:

- Ecological sustainability provides a foundation upon which land management can contribute to economic and social sustainability.
- Public land management must be integrated into broader regional landscapes. Consider the larger landscape in which National Forests and grasslands are located in order to understand their role in ensuring ecological sustainability and contributing to human uses and values.
- Establish collaborative relations that provide opportunities and incentives for people to work together to contribute to forest planning in meaningful and useful ways. Land and resource planning must provide mechanisms for broad-based, vigorous and ongoing opportunities for open dialogue.

- Make desired future conditions and the outcomes associated with them the central reference points for planning
- Planning must be dynamic and ongoing because the social values and scientific knowledge which guide decision making will change with time.
- Monitoring needs to be given strong emphasis in planning. Adaptive management and learning are not possible without effective monitoring of actual consequences from management activities.

With these recommendations in mind, the next generation of Forest plans will be developed in a collaborative and participatory manner with an emphasis on frequent, meaningful public involvement opportunities. The document itself will use detailed desired condition descriptions to provide a clear vision of what we are striving to achieve. Objectives will describe specific, measurable outcomes that can be used to evaluate our progress. At the same time, new plans will allow considerable flexibility in the means by which objectives and desired conditions are to be achieved. This will make it easier to adjust our management practices in response to monitoring results, changing conditions on the ground, or evolving scientific doctrines.

Since the Ashley's current Forest Plan was developed under different planning regulations, this will be the first report documenting the existing conditions and trends and the need to change from the Forest Plan. We have a variety of documents available to help us identify changes in conditions or trends, including the Analysis of the Management Situation (completed in 1982) and a monitoring report on implementation of our current Plan (completed after 5 years of implementation, as required by NFMA). These documents, in combination with other inventories and assessments available to us and 20 years of experience with the 1986 Forest Plan, will help us evaluate the effectiveness of our current management direction.

2. Evaluation of the Ashley's Current Forest Plan

The Ashley's Forest Plan was due to be revised in 2001. However, national and regional budget constraints dictated that Forest Plan revision efforts in the Intermountain Region (including the Ashley) be staggered across several years. The Ashley was therefore scheduled to begin plan revision in 2004. We spent the first year updating various inventories and assembling databases to assist us in assessing existing resource conditions, and in conducting an internal review to determine how well our Plan was - or wasn't - working to guide resource management.

Although one obvious reason we are revising now is the age of our current Plan, we also know that a number of course corrections need to be made. A detailed monitoring report covering the period from 1986-1991 noted a variety of problems associated with budgetary and logistical limitations on our ability to implement the Plan, as well as some fundamental shortcomings in the Plan as a guiding document for resource management. These latter problems were generally attributed to the scale at which management direction was applied (i.e., the small size of computer generated management areas in the 1986 Plan), the lack of a clearly articulated desired condition for most resources and

landscapes, and impractical and/or outdated monitoring programs. Nevertheless, the report concluded that we had done a good job of following standards and guidelines and were generally meeting objectives at the Forest level. Therefore, we also expect that certain parts of our current Plan might still be working well, and may be carried over into the revised Plan.

In order to identify specific areas in need of change we convened an interdisciplinary team in the winter of 2004-2005, and asked team members to evaluate the following things:

- Current resource conditions and issues in their program area, with emphasis on changes that had occurred since the first Forest Plan was signed
- Adequacy of existing Forest Plan direction; for example, whether or not desired conditions were clearly defined and management objectives were identified to help achieve desired conditions.
- Adequacy of the monitoring plan - its effectiveness, practicality and consistency with current science and technical guidance.
- The need for new or revised management direction to deal with current resource issues.

Results of their evaluations showed that while some existing management direction was still appropriate and effective, many parts of the Plan could be improved in format and/or substance. Numerous issues were identified, some of which were localized to one or a few parts of the Forest or were related to difficulties with implementation rather than flawed plan direction. However, there were several issues or themes that were raised by multiple resource specialists, and which are clearly strategic or broad-scale in nature. These themes are summarized as follows:

A. Lack of a clearly articulated desired condition and/or strategy for achieving management goals

Almost every program manager cited this as a problem. Managers are often left to infer desired conditions from brief statements of goals and objectives, without any accompanying narrative information. Some management topics are not addressed at all (for example, ground water resources, public education and interpretation of heritage resources, the role of fire ecology and fuels in vegetation management, protection of karst and paleontological resources). Even when desired conditions were specifically addressed (as they were for forest vegetation), the underlying intent was not clearly identified and strategies for achieving desired conditions are missing or vague. Since descriptions of desired conditions provide the foundation of new Forest Plans, this is a critical gap in our existing management direction.

B. Outdated, inappropriate or impractical management direction, especially regarding monitoring

This is not surprising, given the age of our Forest Plan. Over the past 20 years a great deal of new research has been done in land and resource management fields, and new management directives have been issued by the Forest Service. Our Forest Plan has not kept pace with these changes. For example, Forest Plan direction for managing water resources emphasizes maximizing water yield and maintaining water quality in surface waters. Watershed management is actually much more complex, involving systems made up of surface waters, ground water, and riparian zones, and influenced by soils, vegetation and physical aspects of landscapes that affect water movement and determine the inherent stability or instability of the system. Simply meeting water quality standards and increasing water yield is not sufficient to maintain healthy watersheds.

Examples of other program areas where new management direction has been issued since the Forest Plan was completed include range management, soil productivity, noxious weeds, fire and fuels, scenery evaluation, wilderness, and heritage resources. In each case there is a need to review and revise Forest Plan direction to ensure that we are consistent with agency goals and the best available science today.

C. Unanticipated or unacknowledged trends in vegetative conditions and disturbance regimes

The Ashley recently completed an assessment of fire regime and condition class on the Forest. This analysis compared vegetative conditions, fuel loads and fire frequency/severity to historical conditions, and classified lands into areas of low, moderate or high departure from natural (historical) conditions. The resulting map showed that 67% of Forest lands are in a condition that is moderately or highly different than would be expected under a natural disturbance regime. The trend is toward increasing fuel loads over time. This is an issue that is common to many areas in the western United States, and is highlighted in the Forest Service's national strategic plan as one of four major threats to the nation's forest lands.

This is especially evident in some of the dominant forest types on the Ashley. Large, homogeneous areas of mature trees are susceptible to mortality from bark beetles, and this is exactly what occurred in the 1970s and 1980s in the eastern Uinta Mountains. An outbreak of the mountain pine beetle caused extensive mortality in lodgepole pine, mixed lodgepole/spruce/fir, and ponderosa pine stands. Forest management over the last 20 years has focused on salvage harvest of the dead trees. Meanwhile young trees have become established in the understory of beetle-killed stands, with or without salvage harvest. Thus large landscapes of uniformly mature forest have been replaced by equally large landscapes of uniformly young trees. These young stands are now tall and dense enough to carry a fire, and where salvage did not remove the dead trees, provide ladder fuels mixed with downed wood and standing snags. At the same time, beetle activity is increasing in stands that were not significantly affected by the last round of bark beetle mortality. These are conditions under which large (20,000+ acre) fires can be expected. Although regrowth of young trees was prolific following the beetle kill, regrowth following a severe fire may be limited by a lack of mature trees to serve as a seed source.

Even-aged stands, mortality due to bark beetles, and subsequent fire are all part of the natural cycle in lodgepole pine forests. Fire is also a natural and necessary agent in maintaining other forest types, especially ponderosa pine forests. However, the scale at which these events occur need not be as large as it has been and is poised to be again on the Ashley. Extensive, severe fires have the potential to damage watershed health as well as reducing vegetative and wildlife diversity. Neither the current Forest Plan nor recent landscape and watershed assessments done on the Forest have adequately addressed these risks, or considered management alternatives that might moderate them by creating more age and structural diversity in forests at the landscape level and bringing fuel loads in line with historical norms. These are issues that need to be studied and discussed during Plan revision.

Several resource specialists also cited conifer encroachment into aspen and/or shrub communities as a problem, because it reduces vegetative and wildlife diversity. Such encroachment is usually due to fire suppression, since periodic fire would otherwise kill the conifers and stimulate regeneration of shrubs and aspen clones. A monitoring report issued in 1995 estimated that aspen had been reduced to about one third of the area it formerly occupied on the Ashley, largely due to lack of disturbance. Forest-level monitoring studies show that both aspen and sagebrush generally come back well after disturbance (with a few localized exceptions) and the trend in aspen is now strongly upward at the Forest level. If we want this trend to continue, it will require ongoing active management to restore natural disturbance regimes. The current Forest Plan says little about whether or not this is desirable, or how management should take natural disturbance regimes into account.

D. Resource impacts due to increased human use

Several resource specialists cited the amount and type of recreation use that is occurring as a source of concern. The current Forest Plan did not anticipate the popularity of OHVs and snowmobiles, much less the technological advances that enable riders to go further and over rougher terrain than ever before. Likewise, planners in the 1980s could not have foreseen the current level of interest in adventure sports such as mountain biking, rock climbing, and spelunking. Coupled with population growth, we have a situation in which more users are pursuing a wider variety of activities than were addressed in the first round of Forest planning. Our challenge is to provide facilities and opportunities for the full spectrum of users, while avoiding unintended and undesired impacts to Forest resources such as wildlife, riparian zones, scenic integrity, recreation settings, and wilderness characteristics in the High Uintas Wilderness. Unplanned and unmanaged recreation is an issue that the Ashley shares with many other National Forests, and which is addressed in the agency's national strategic plan as one of four major threats to our public lands.

E. Potential for resource impacts due to energy development

Oil and gas activity has historically been quite limited on the Ashley. Over a period of several decades, about 40 wells were drilled and subsequently abandoned Forest-wide.

However, with the current economic situation and recent advances in drilling methods and tools, there has been renewed interest in developing leases. The Forest Service is committed to helping meet the nation's energy needs, and has made this a goal in its national strategic plan. The Bureau of Land Management is responsible for issuing and administering leases on federal lands, but as the surface managing agency the Forest Service is responsible for protecting non-mineral interests by identifying protection measures and stipulations to be included in leases. Examples of concerns related to oil and gas development include impacts to air quality, displacement of wildlife and loss of wildlife habitat, and disruption of surface and ground water systems. An Environmental Impact Statement completed in 1997 provides some direction for managing oil and gas leasing on certain parts of the Forest. However, the Forest Plan itself provides very little overall guidance for how to handle these issues.

There is also a need to review provisions in the current Plan for utility corridors and communication sites. Long-term needs identified by industry representatives need to be compared to areas we have designated, to determine if those areas are still adequate and appropriate.

3. Proposed Scope for Forest Plan Revision

The first round of Forest planning necessarily addressed every activity and resource we manage. In this round, we are charged with reviewing and revising existing plan direction as needed, not rewriting the entire plan. Although we can find many things that we would like to change in our current Forest Plan, not all of those things are urgent or necessary to maintain economic, social, or ecological sustainability. Under adaptive management Forest planning will involve continual monitoring, evaluation, and adjustment of management direction. So it makes sense to prioritize issues and needs for change in our plan, deal with the most critical issues first, and then work through less urgent issues in subsequent amendments and administrative corrections.

The previous section provided a sampling of the planning issues and concerns raised by resource managers on the Ashley. The examples provided were chosen because they affected large areas and/or multiple resources, or were representative of a common type of problem (such as out-dated monitoring protocols). Additional issues and more detailed discussion of each of these topics can be found in the individual program area narratives filed in the project record.

The Ashley developed some considerations to help us address issues that were proposed as revision topics (see Appendix A). We used these considerations to help us sort through the concerns raised in the program area narratives, and that led us to propose the following topics as relevant, timely and appropriate for consideration:

- Develop clear desired condition statements at socially and ecologically meaningful geographic scales, and tier management strategies and monitoring requirements to those conditions.

- Revise management direction for water resources to include all aspects of watershed health, and integrate water-dependent resources.
- Revise recreation management goals and objectives to reflect current uses and trends.
- Incorporate fire ecology and fuels management recommendations from our Forest-wide fire plan into desired conditions and management strategies, to help us address trends in vegetative conditions and disturbance processes.
- Focus revision efforts on areas of the Forest where current direction is vague or out-dated. Congressionally designated areas such as the High Uintas Wilderness and Flaming Gorge National Recreation Area have relatively clear direction, tied to their respective enabling legislation and establishment records. In addition, an amendment completed in 1997 provides management direction for the High Uintas Wilderness that is generally still adequate and appropriate. We propose to roll over existing desired condition and management direction for each of these areas with few if any modifications, and focus our efforts on developing new direction for the remaining areas of the Forest (i.e., eastern Uintas, western Uintas outside of the wilderness, and the south unit of the Duchesne Ranger District; see Appendix B for a map of these areas).

We recognize that there are many other topics that are pertinent to land management and of high interest to Forest users. We will be inviting public comment on this list of proposed topics, and anticipate that some changes will be made as result of that comment. However, we also remind ourselves and our public that planning is meant to be a continuous process and is to be conducted at a broad scale. We cannot and will not address every issue raised in this revision effort. We can and do promise that we will continue to evaluate and amend our Forest Plan on a regular basis, beginning immediately after revision is completed. No issue that is raised will be ignored, but consideration of some may be deferred to a later date.

Our intent is to convert our Plan to the format prescribed by the new planning regulations and address the most serious gaps or flaws in our existing management direction first. We will rely on the criteria listed above and in Appendix A to help us determine which issues to include at this time.

The rest of this report will discuss the current ecological, social, and economic conditions and trends. Each of these sections will discuss the current conditions and trends of these three aspects of sustainability along with their associated potential risks. It will also describe the desired future conditions and goals from the 1986 Forest Plan and the need for change for each section.

Concerning the desired future condition; the 1986 Forest Plan split up the Ashley NF into 14 management areas and developed maps showing where certain “activities” could occur. Management area prescriptions were described based on these activities as well as the goals, objectives, and standards and guidelines. These management activities included recreation, wilderness, wildlife and fish, range, timber, soil, water, air, minerals and energy, riparian, lands, facilities, and protection. Desired future condition was

briefly described for the entire Forest, but did not specifically describe desired future conditions by these management activities. The *Desired Future Condition* section in the 1986 Forest Plan did mention most of these management activities, but some were excluded.

4. Ecological Conditions and Trends

4.1. Ecosystem Diversity

4.1.1. Landscape Diversity

Landscape diversity on the Ashley NF was evaluated using the National Hierarchical Framework of Ecological Units. This hierarchical framework is a systematic land classification and mapping method that was developed to provide a scientific basis for implementing ecosystem management (Cleland and others 1997). The National Hierarchical Framework of Ecological Units is described as, “a regionalization, classification, and mapping system for stratifying the Earth into progressively smaller areas of increasingly uniform ecological potentials. Ecological types are classified and ecological units are mapped based on associations of those biotic and environmental factors that directly affect or indirectly express energy, moisture, and nutrient gradients that regulate the structure and function of ecosystems. These factors include climate, physiography, water, soils, air, hydrology, and potential natural communities” (USDA 1993).

We used the National Hierarchical Framework because it gave us the ability to take a broad ecological approach when assessing landscapes on the Ashley NF, and allowed us to integrate the abiotic and biotic ecosystem elements of geology, geomorphology, soils, and vegetation that were used to classify and map these landscapes. This integrated approach permitted a landscape-level evaluation of ecosystems on the Ashley NF that revealed important distinctions between vegetation characteristics among the mapped landscapes.

The Ashley NF is made up of diverse ecosystems spanning three physiographic divisions, four sections, and fifteen subsections as defined by the National Hierarchy. The four sections include the: Uinta Mountains, Green River Basin, Tavaputs Plateau, and a very small portion of the Uinta Basin.

Geologic structure and soils that have formed over millions of years, combined with current and historic climatic patterns, continue to influence the size, shape, and spatial relationships of plant cover types and other ecosystem elements. For example, in alpine landscapes plant community composition and distribution are determined by geomorphic and climatic features including snow accumulation and duration (Komarkova 1979, Willard 1979). Likewise, geologic material and geomorphic processes are major factors that have influenced the landforms of high desert landscapes. These landforms include wind-sand, pediments of old streams, benches or plateaus, saline or alkaline flats, moderately to highly dissected slopes, and scarps. The strong influence of landforms on

plant communities is essential to understanding the composition, structure, and vegetative processes affecting landscapes.

4.1.1.1. Rare or Specialized Ecosystems

Certain ecosystems within the landscapes on the Ashley NF are rare or specialized enough to be mentioned separately. These ecosystems generally occur within a certain landscape classified through the National Hierarchy as a Landtype Association (LTA).

These ecosystems include the ground moraines and potholes of the Sims Peak Research Natural Area, peatlands in the Glacial Bottoms LTA, spiked big sagebrush communities in Avintaquin Canyon, the erosive barrens of the Duchesne River Formation; Morrison Formation; and Moenkopi Formation that provide unique habitat for endemic plants, the rim of Ashley Gorge, the fens and floating mats of the wet meadows of the Trout Slope LTA, and the raw erosive slopes and ridges of the Green River Formation and Uinta Formations found on the Anthro Plateau LTA.

4.1.2. Vegetation Diversity

Existing condition for vegetative communities was determined using stand exam data, satellite and aerial imagery, field mapping, and previous assessments (Table 4-1). Existing conditions were also documented in the Ecosystem Diversity Evaluation Report (USDA Forest Service 2009a) where an estimated departure (i.e., low, moderate, or high) from the historical range of variation (HRV) was assigned based on selected departure variables.

Table 4-1. Existing vegetation types on the Ashley NF

Vegetation Type	Acres	Percent of Forest
Alpine	168,394	12.0%
Mixed conifer	241,871	17.3%
Lodgepole pine	149,116	10.6%
Engelmann spruce	144,998	10.4%
Douglas-fir	47,441	3.4%
Ponderosa pine	36,780	2.6%
Subalpine fir	5,600	0.4%
Blue spruce	402	0.0%
5-Needle, Limber, and Bristlecone pine	76	0.0%
Seral aspen	117,481	8.4%
Persistent aspen	36,057	2.6%
Pinyon/juniper	124,181	8.9%
Mountain brush	43,524	3.1%
Mountain big sagebrush	92,494	6.6%
Wyoming big sagebrush	15,604	1.1%
Black sagebrush	10,747	0.8%
Basin big sagebrush	3,187	0.2%
Fringed sagebrush	842	0.1%
Greasewood	1,898	0.1%
Grassland	14,538	1.0%

Desert shrub	66,326	4.7%
Riparian forest	8,420	0.6%
Riparian meadow	17,305	1.2%
Riparian willow	8,971	0.6%
Irrigated pasture	764	0.1%
Total	1,357,017¹	96.8%

Trend was assessed based on long-term field studies, local knowledge, current literature, or by modeling selected vegetation communities using the Vegetation Dynamics Development Tool (VDDT). About 783,000 acres or 56% of the Forest (Table 4-2) were modeled using VDDT from present through 300 years, and these results were compared to established sustainable conditions² (Appendices C and D). Vegetation communities were excluded from modeling if they were less than 20,000 acres, management activities were low to none, and/or vegetation dynamics were such that structure changes were very slow, or change was not complex (e.g., alpine or grassland communities). However, the black sagebrush-pinyon/juniper and mountain big sagebrush-pinyon/juniper communities were included in the analysis even though the total acreages associated with these models were less than 20,000 acres. The reasons for modeling these sagebrush communities were that we were interested in the potential trends of pinyon/juniper encroachment on sagebrush communities, and we didn't have to spend a lot of time on these models because they were already created and tested by other Forests and we only had to provide the number of acres for each structure class.

Table 4-2. Vegetation communities modeled on the Ashley NF using VDDT

Plant Community	Acres
Black sagebrush-Pinyon/Juniper	12,330
Wyoming big sagebrush-Pinyon/Juniper	54,056
Mountain big sagebrush-Pinyon/Juniper	19,802
Mountain shrub-Pinyon/Juniper	72,167
Mountain big sagebrush-Aspen	125,332
Ponderosa pine-Aspen	44,912
Douglas-fir-Aspen	94,310
Mixed conifer-Aspen ^{3,4}	284,277
Lodgepole pine	76,110

Alpine

Vegetative structure in alpine communities is currently limited to low growing herbaceous species over much of the area and dwarf and low willows in some sites. Plant community composition and distribution are determined by geomorphic and climatic

¹ Flaming Gorge Reservoir (42,863 acres or 3.2% of the Forest) was not included in the table

² Sustainable conditions were determined by structure class for each vegetation community modeled using current literature, proper functioning condition reports, long-term trend studies, local knowledge, and the best available science.

³ Mixed conifer includes lodgepole pine < 80%, Engelmann spruce, and subalpine fir

⁴ Includes seral aspen

features including snow accumulation and duration determined by wind and topography (Komarkova 1979; Willard 1979). This relatively simple community structure has remained essentially the same since pre-settlement, and indicates that current patterns and trends of plant communities are likely consistent with historical patterns and trends. Brown (2006) also found that plant community distribution in the Uinta Mountains is consistent with that described for reference or relic alpine areas (Komarkova 1979; Willard 1979).

Photographs from long-term trend studies show a slow upward movement of the tree line within the previous 40 to 150 years with isolated patches of young conifer occurring above tree line over the last 20 years. These fluctuations in tree line have typically been associated with historical glacial and warming periods and are likely part of historical cycles. Invasive species are currently not known in the alpine communities of the Ashley NF.

Engelmann spruce

Engelmann spruce stands on the Ashley NF often occur in boulder fields or other rocky sites and are dominated by older larger diameter trees. Stand size is often affected by geomorphic features such as leeward aspects or large alpine moraine basins. Very little harvest of Engelmann spruce has occurred on the Forest because most of this forest type is found in the High Uintas Wilderness. Fires have generally not been suppressed due to inaccessibility and the fact that large fires rarely occur in these scattered, high elevation forests.

Generally, available forest fuels in Engelmann spruce stands on the Forest is low compared to other forest vegetation types that also occur in higher elevations. This is due to the low productivity of these stands. Typically rock fields disrupt any continuous supply of down and dead woody debris and the presence of other vegetative communities such as low herbaceous plants and shrub communities associated with fine fuels.

Fire frequency is often much longer (Bradley and others 1992) in the Engelmann forests on the Ashley NF due to cooler temperatures, the persistence and early return of snow, and the annual pattern of summer rains. The lack of lodgepole pine in the Engelmann spruce belt indicates fire intervals are typically greater than 200 years (Volland 1985). Lightning strikes might be abundant due to the high elevation, but actual starts are generally few because in these high elevation sites rain often accompanies lightning strikes. Likewise, the size of fires is relatively small due to the presence of rocky interspaces, relatively low amounts of coarse woody debris, and fine fuels.

Because a majority of the Engelmann spruce forests occur in the High Uintas Wilderness area, management is low to non-existent. This means that the ecological processes that have shaped the existing structure of these forests will likely continue. There is a distinct possibility that spruce beetle outbreaks could alter these stands in the future, affecting the current structural stages.

Subalpine fir

Subalpine-fir is most often associated with other coniferous species on the Ashley NF. Generally it occurs in the later seral stages of mixed conifer with Engelmann spruce above 9,600 feet elevation, but also occurs in Douglas-fir stands in the South Unit of the Forest.

A mixture of Engelmann spruce, subalpine fir, and lodgepole pine is common in the late seral, closed canopy stage of mixed conifer forests. In this seral stage a majority of the lodgepole pine is mature and Engelmann spruce and subalpine fir are represented by mature and other age-classes. In theory, subalpine fir is considered more shade tolerant, and therefore believed to have the capacity to displace Engelmann spruce. However, Engelmann spruce generally has a much longer lifespan barring any spruce beetle outbreaks. Currently, a majority of this type is mid-aged and mature to over-mature. Species composition in younger stands is typically weighted towards subalpine fir.

Subalpine fir composition would follow the trend of high elevation mixed conifer, Engelmann spruce, and Douglas-fir communities. The amount and distribution of subalpine fir on the Forest will vary over time through seral stages depending on species composition and disturbance (i.e., fire and/or insect outbreaks).

Mixed conifer

For some landscapes on the Forest, existing conditions in the mixed conifer type have generally been influenced by timber harvest, beetle epidemics, fire suppression, or previous fire activity. Human caused disturbance and/or fire suppression have resulted in forested patch sizes that are likely smaller than historical landscape patterns. These activities have also increased the amount of available fuel and decreased the fire return interval. Where human activities have had little to no affect on landscape patterns, characteristics such as patch size, available fuel, and fire return intervals are similar to patterns and processes that occurred historically.

Currently almost one half of the mixed conifer type on the Forest is in a young to mid-aged structural stage with size classes ranging from 4 to 12 inches dbh. Almost two thirds of this structural stage may have high fuel loads due to the dead tree component either standing or on the ground.

Table 4-3. Existing structural stage distribution for mixed conifer forests

Structural Stage	Size Class (inches/dbh)	Percentage of Type
Grass/forb & Seedling/Sapling	0 to 4	6
Young & Mid-Aged Forest	4 to 12	46
Mature Forest	12 to 16	22
Old Forest	16 +	11

A large mountain pine beetle epidemic of the 1980s greatly changed the structure of mixed coniferous forests stands east of the Whiterocks drainage and on the north slope of the Uinta Mountains. Currently a massive mountain pine beetle epidemic is changing the structure of mixed coniferous forest stands in all drainages west of the Whiterocks

drainage. This current epidemic has also spread across the north slope of the Uinta Mountains.

Under current management, a 300 year projection indicates a decrease in structural diversity in these mixed conifer forests, primarily in the younger age classes. Under current management, mixed conifer stands move toward the mature and old structural stages while displacing aspen. Modeling using VDDT also indicates that fuel loads increase on some landscapes in these older stages, especially in areas where fire suppression activities are more frequent.

Lodgepole pine

Lodgepole pine communities on the Ashley NF represent the southern extent of the range of lodgepole pine in Utah. On the Ashley NF lodgepole pine is the tree species most affected by timber harvest. This is primarily associated with the increase in timber harvests after the beetle kill epidemics of the 1980s. During these epidemics, bark beetle caused tree mortality reduced the percentage of trees in the mature and older structural stages in lodgepole pine stands (Table 4-4).

Table 4-4. Existing structural stage distribution for lodgepole pine forests

Structural Stage	Size Class (inches/dbh)	Percentage of Type
Grass/forb & Seedling/Sapling	0 to 3	21
Young & Mid-Aged Forest	3 to 9	66
Mature Forest & Old Forest	9 to 12+	13

Similar to mixed conifer forests, lodgepole pine communities have been affected by timber harvest, beetle epidemics, and fire suppression. Timber harvests in the recent past have occurred on a 40 acre or less patch size design, which is very different from patch sizes and patterns created historically by large stand-replacing fires. For example, the fire described by Ogle and DuMond (1997) during the late 1870s covered the greater portion of four townships in the southeast portion of the Ashley NF. This fire provides evidence that fire influenced lodgepole pine landscapes were likely much larger historically.

Fire suppression has also allowed the amount of available fuel to increase and lengthened the fire return interval. Volland (1985) determined that fire return intervals of 15 to 20 years can be expected to reduce the lodgepole pine component, fire return intervals of 100 to 150 years can be expected to favor lodgepole pine dominance, and fire intervals over 200 years can be expected to eliminate lodgepole pine. Fire suppression over the last 100 years has likely altered the fire return interval and potential magnitude of fire in lodgepole pine communities on the Ashley NF.

Although lodgepole pine forests may be moderately different from historical conditions due to smaller patch sizes, slightly higher fuel loads, and increased fire return intervals, lodgepole pine has regenerated in abundance in almost all harvested and burned areas on the Forest.

Similar to existing conditions, long term trends of lodgepole pine forests vary by different landscapes on the Forest. In the eastern portion of the Forest, 300 hundred year projection trends using VDDT show a decrease in structural diversity primarily in the younger age classes. In these areas, lodgepole pine stands move toward the mature and old structural stages under current management scenarios with less recruitment of the younger stages. Modeling also indicates that fuel loads increase in the older stages on these landscapes. In the western portion of the Forest, modeling results indicate that lodgepole pine forests maintain a high level of structural diversity over a 300 year period with minor fuel loads. This prediction may change due to the massive mountain pine beetle epidemic currently occurring in these stands.

Douglas-fir

There has been little harvesting and lack of fire in Douglas-fir stands on the Ashley NF; therefore a majority of these stands are in the older age classes. Most of these stands have recently experienced a beetle epidemic, causing mortality of the majority of the trees greater than 8 to 10 inches in diameter. Consequently, in some stands, fuel loads could increase from 40 to 60 tons per acre in the next three to five years. Currently about ¼ of the Douglas-fir type may have higher fuel loads compared to historical fuel loads in this type.

Currently, fire return intervals appear to be similar to historical return intervals on a portion of the Douglas-fir landscapes. Evidence of this is associated with the presence of aspen in areas dominated by Douglas-fir stands, and the return of alder-leaf mountain mahogany after fire in some landscapes (i.e., Red Canyon). The presence of aspen and alder-leaf mountain mahogany indicates that fire return intervals have been frequent enough to support this type of diversity. On other landscapes, fire appears to have played a minor role in Douglas-fir stands the last 100 years. However, with the increase in available fuel that will follow the recent bark beetle epidemic, fire associated with higher fuel loads will affect the type of vegetation that regenerates within these affected landscapes and the return interval of the Douglas-fir type.

Long-term analysis using VDDT modeling indicates a slight decrease in structural diversity as a majority of the stands grow into the old forest structural stage under current management scenarios. As these stands age, Douglas-fir begins displacing aspen. Modeling also indicates that fuel loads increase in all structural classes of Douglas-fir stands in the eastern portion of the Forest.

Ponderosa pine

Ponderosa pine forests on the Ashley NF have recently been influenced by a mountain pine beetle epidemic and 100 years of fire suppression. The effects of bark beetles on fire occurrence and severity is largely unknown in the ponderosa pine type (Simard and others 2008). However, one of the greatest departures from historical conditions for vegetation on the Forest is found in the ponderosa pine on the Greendale Plateau, where a massive mountain pine beetle epidemic of the 1980s killed a high percentage of the larger ponderosa pine trees.

In an attempt to suppress the beetle epidemic, infested trees were harvested and removed from the forest. This strategy was facilitated by flat terrain that was easily accessible. In some areas, over 80% of the ponderosa pine was logged. In addition, the percentage of harvested area far exceeds that of any other forest type on the Ashley NF. Currently only about 8% of the ponderosa pine type is in a mature to old structural stage.

Tree mortality due to the mountain pine beetle epidemic followed by harvest left fewer large live and dead trees on affected landscapes than what might have been there historically. Larger live trees are currently scattered in some stands, but are not of sufficient density or basal area to be a dominant feature found in these areas compared to historical patterns of larger trees on ponderosa pine sites. A sustainable and resilient condition for ponderosa pine forests includes a variety of structural and age classes scattered across the landscape. However, existing condition on the Ashley NF is heavily weighted toward the early and mid-seral stages.

Because of fire suppression efforts over the last 100 years, ponderosa pine saplings and Rocky mountain juniper have increased at lower elevations. Rocky Mountain juniper and ponderosa pine saplings provide ladder fuels allowing fire to access crowns on larger trees. This abundance of smaller trees also contributes to an increase in the fuel load of the stand. Such stands are prone to stand replacement fire that is atypical of the fire regime in this type.

Over the previous 20 year period, a majority of the ponderosa pine stands have been under-burned on the Ashley NF. These low intensity prescribed burns have reduced available fuels in this vegetative type to levels that are likely to have occurred historically. Because fire has been suppressed in this type for the past 100 years there is still a high degree of departure from historical fire return intervals within many of the ponderosa pine stands. Mean fire return intervals of ponderosa pine on the Forest are supported by a large volume of literature, including a site-specific study by Palmer (1993). This study was based on a number of fire-scarred stumps in which Palmer determined a mean fire return interval of about 21 years for the ponderosa pine belt of the Greendale area. This fire return interval is consistent with the fire interval ranges reported in several other studies (Bradley and others 1992).

Vegetation modeling indicates the long-term pattern in ponderosa pine forests on the Ashley is toward larger trees; however there is only a slight upward trend initially that begins to level off within 50 years. Modeling scenarios indicate that current ladder fuels consisting of young ponderosa pine saplings and Rocky Mountain juniper tend to keep individual ponderosa pine trees from reaching older structural stages using only prescribed fire. Management strategies may require other treatment methodology to return ponderosa pine forests to park-like communities that occurred historically.

Aspen

Aspen on the Ashley NF is generally separated into two categories based on successional patterns. Seral aspen describes aspen communities that, in the absence of disturbance, are

eventually replaced by conifers. This usually occurs following one generation of aspen. Persistent aspen describe communities, usually at lower elevations and/or on drier sites, where conifer encroachment is minimal to non-existent with or without fire or other disturbances.

Seral Aspen

Most of the seral aspen on the Ashley NF is in various stages of conifer displacement on all seral aspen landscapes. On the north slope of the Uinta Mountains there has been a large loss of the aspen component that has been replaced by mixed conifer and a minor amount to spruce/fir. However, there has also been a large increase in aspen regeneration on the north slope of the Uinta Mountain in areas affected by the 1980's mountain pine beetle epidemic and a few large fires. Trend for aspen in this area is upward. Currently, most of the seral aspen on the Ashley NF is in the mature to old seral stages.

Fire is the most important disturbance agent in aspen communities because of its ability to influence changes in structural stages and species composition. Fire return intervals necessary to sustain aspen range from 100 to 300 years (Bradley and others 1992). However, due to fire suppression, a majority of the seral aspen stands on the Forest in many areas are in the advanced stages of displacement caused by conifer encroachment.

Management trends indicate a continual decline in structural diversity as seral aspen stands move toward mature and old structural stages with little to no aspen recruitment. This trend is evident in VDDT aspen modeling within all coniferous forest types including ponderosa pine, Douglas-fir, mixed conifer, and lodgepole pine on the Forest. However, in areas that have seen recent disturbance, trend appears to be upward.

Persistent aspen

Persistent aspen communities on the Ashley NF are primarily restricted to lower elevations and are generally confined to drainages and cooler exposures, which may resemble the historical pattern of aspen distribution in these areas. Persistent aspen stands typically occur adjacent to sagebrush and grassland communities, and are generally located in areas that cannot support spruce, fir, or lodgepole pine communities. This lack of coniferous tree presence reflects the comparatively warm and dry conditions where persistent aspen stands occur. Native understory plants dominate persistent aspen stands with cheatgrass either lacking or of minor significance.

Clonal differences in individual persistent aspen stands make generalized statements about existing condition and trend difficult. Some clones demonstrate great ability to regenerate, while other clones seem to lack this feature. Various clones demonstrate the ability to regenerate after partial cutting and burning, while other clones have low sprouting potential following partial cutting or fire. Browsing or grazing can suppress aspen sprouting; however examples from the Ashley NF demonstrate that grazing or browsing has not suppressed aspen regeneration on the Forest.

Many of the larger persistent aspen stands on the Ashley NF have not burned recently. However, many of these stands are structurally diverse and are represented by sprouts,

saplings or poles, and mature trees. Where fire has occurred within persistent aspen stands, aspen regeneration has been vigorous and abundant. Aspen stems typically grow quickly beyond the level of ungulate browsing, eventually reaching maturity. This successive pattern indicates that aspen stand structure resembles previous aspen patterns on these sites. In addition, only minor harvest activities affecting persistent aspen stand structure has occurred on the Forest.

Persistent aspen stand trend on the Ashley NF appears stable; with aspen stand regeneration occurring without major disturbance. In the last few years many persistent aspen stands in the eastern Uinta Mountains have died back. This includes mortality of mostly older or larger trees. However, most of these stands show active and vigorous sprouting. Vegetation modeling using VDDT indicates relatively good structural diversity in persistent aspen stands over the next 300 years, with a majority of these stands consisting of a mid-aged structural stage.

Mountain shrub

Mountain shrub communities on the Ashley NF are currently in the mid to late seral stages, and are also at various stages of displacement by coniferous tree species. Mountain shrub communities are vulnerable to pinyon/juniper encroachment at lower elevations, and to Douglas-fir encroachment at higher elevations. Many mountain shrub communities in pinyon and juniper dominated landscapes appear to be at various stages of displacement by pinyon and juniper, but still appear resilient. In other areas, crown cover of mountain shrub communities has stayed around 30% with light conifer encroachment. In areas where conifer encroachment is more advanced, mountain shrub communities will likely be displaced by coniferous species within the next 150 or so years if fires, or other vegetation treatments, are not allowed to reduce conifer encroachment.

Modeling using VDDT indicates that trend for the mountain shrub communities under current management is displacement by pinyon and juniper woodlands within 300 years on all landscapes except those within the Flaming Gorge National Recreation Area. The reason that this area does not have the same trend as the rest of the Forest is due to the recent 20,000 acre fire of 2002 that burned a majority of the mountain shrub communities and pinyon/juniper woodlands in this area.

In the eastern Uinta Mountains near the Dutch John area, sustainability of highly productive and diverse alder-leaf mountain-mahogany/bluebunch wheatgrass communities is dependent on fire or other disturbances that reduce pinyon and juniper encroachment. In a study by Huber and others (1999), a high diversity of understory plants was found with less than 20% canopy cover of pinyon/juniper. Plant diversity was indicated to be at risk when pinyon/juniper reached crown cover levels of 20%. Beyond 40% crown cover of pinyon/juniper, the understory was greatly depleted. In addition, Loftin (1999) found greater plant species richness with less pinyon/juniper cover. Other studies in the area indicate that depletion of understory species is associated with decreased resilience or ability of the native community to recover after fire.

Shrublands

Mountain big sagebrush

Mountain big sagebrush communities make up about 85-95% of the total sagebrush on the Ashley NF. Currently mountain big sagebrush communities appear resilient on landscapes that have been affected by periodic fire. On other landscapes, mountain big sagebrush communities are at various stages of conifer displacement. Some landscapes where fire has not been suppressed, or where prescribed burning has occurred recently, have less conifer encroachment and sagebrush stands are increasing in canopy cover.

The reason mountain big sagebrush communities are resilient and diverse where fire is part of the ecosystem is due to the relatively short time from stand replacement fire to mature sagebrush dominance. This time period is usually about 15 to 30 years and generally limits displacement of big sagebrush communities by coniferous trees on the landscape. Average canopy cover of mountain big sagebrush has returned to pre-burned levels within about 20 years under these conditions (Goodrich and others 2008). However, without disturbance, mountain big sagebrush communities on some landscapes can persist for decades with high densities of crown cover.

Models were developed for two types of mountain big sagebrush communities on the Ashley NF and modeled using VDDT. One of these models projected trends in mountain big sagebrush communities that occur on the ecotone with pinyon/juniper woodlands. Although this is not the dominant community type for mountain big sagebrush communities on the Forest, trends for these communities show an eventual displacement of mountain big sagebrush by pinyon and juniper on all landscapes except those where recent fires such as the Whiterocks fire of 1988 and the Neola North fire of 2007 burned a large portion of these pinyon/juniper and mountain big sagebrush communities.

The more common and widespread mountain big sagebrush type on the Ashley NF is a community composed of mountain big sagebrush within the aspen belt. Trends for this model under current management were mostly stable over time on most landscapes, although there were varying degrees of decline in most areas from the loss of early and mid seral stages as sagebrush grew into the later denser stages. This was especially pronounced in the eastern Uintas where fire suppression is greater. Aspen, however, remained relatively stable over the 300 year modeling period.

Other Sagebrush

Although mountain big sagebrush communities are the dominate sagebrush communities on the Ashley NF, other sagebrush species such as black, low, Wyoming big, basin big, spiked big, and silver sagebrush also occur on various landscapes on the Forest.

Currently black sagebrush communities are being displaced by Douglas-fir at higher elevations and Utah juniper at lower elevations. Although fire is rare in black sagebrush communities due to the comparatively low production of herbaceous species or potential fine fuels, the degree of conifer encroachment that is on the verge of complete displacement in some areas indicates that the fire return interval or some other factor is likely different than what it was historically.

Trends under current management in black sage communities indicate a slightly downward trend due to pinyon and juniper encroachment. Complete displacement might take a long time, however as the older stages of pinyon and juniper begin to dominate the cover of black sagebrush is greatly reduced. Complete displacement of black sagebrush communities by pinyon/juniper has already occurred in some areas on the Tavaputs Plateau.

Existing conditions in Wyoming big sagebrush communities on the Forest are a reflection of the effects of the 20,000 acre Mustang fire (2002) that burned a large portion of this sagebrush community. Consequently, a majority of Wyoming big sagebrush communities are in the early to mid age classes. Where fires have not burned, pinyon and juniper woodlands have displaced, and continue to displace, Wyoming big sagebrush communities.

Trends in Wyoming big sagebrush communities modeled using VDDT indicate that annual grasses will increase and pinyon and juniper woodlands will continue, or begin, to displace Wyoming big sagebrush communities under current management. These trends are also supported by monitoring studies on the Forest. These studies show that although Wyoming big sagebrush communities are currently resilient to the effects of drought and fire, cheatgrass is present in almost all of the Wyoming big sagebrush communities on the Forest. Due to the presence of cheatgrass the potential for displacement of native species in these communities is high. Regardless of the fire frequency and burn patterns of the past, the potential for cheatgrass to drive community dynamics will present new patterns of fire on these landscapes. Where fire might have once been an agent of diversity, it now has the potential to facilitate the spread of cheatgrass, resulting in low structural and species diversity in these communities.

Pinyon/juniper

Pinyon/juniper woodlands probably appeared on the Ashley NF around the Dutch John area sometime after 6,000 BP (Johnson 2000). Historical patterns and future trends described by Tausch (1999) for the Great Basin are applicable to a majority of the landscapes on the Ashley NF where pinyon/juniper woodlands are the dominant vegetation type. Tausch (1999) describes a northerly migration of pinyon and juniper at various times with retreat in other times over the past 18,000 years or so. This history also indicates an increase in area, crown closure, and especially density of pinyon/juniper woodlands since European settlement (Tausch 1999). Currently pinyon and juniper forests are found on a wide range of landscapes and soils types. In some of these landscapes pinyon and juniper have the capacity to dominate a majority of the landscape. Before the 20,000 acre Mustang Fire of 2002, a majority of the pinyon and juniper stands on the Uinta Mountains and Tavaputs Plateau were in the older stages ranging from 100 to over 300 years old with closed canopies and little herbaceous ground cover.

The assessments of Tausch (1999) and Gruell (1999) seem consistent with the description of Floyd and others (2004) for pinyon/juniper woodlands on Mesa Verde. They noted stand-replacing fires with a rotation of 400 years or longer characterize the

pinyon/juniper woodlands on Mesa Verde, and commented that low severity surface fires apparently never have been an important component of the fire regime of that area.

On the Ashley NF, the Mustang Fire of 2002 and the Neola North Fire of 2007 are good examples of recent large stand-replacing fires in pinyon/juniper forests. The Mustang Fire burned over about 20,000 acres of nearly continuous mature woodland of pinyon/juniper that provided crown fuels for this intense, large fire. Although, the comparatively short history of pinyon/juniper dominance here indicates large fires might be rather new to this system, the Mustang Fire is believed to be within an expected fire regime for this vegetation type. In addition, based on the above references, the Mustang Fire was likely not outside the historical range of variation.

Modeling efforts did not specifically target pinyon and juniper as a specific vegetation type, but did model the effects of pinyon and juniper and its association with other vegetation types (i.e., sagebrush and mountain shrub). The results of these models show pinyon and juniper under current management displacing all sagebrush and mountain shrub types within its range. This is also supported by evidence from monitoring studies in the field. For example, by 1980 the only sagebrush areas within the Structural Grain landscape that were free of trees were the flat at the town of Dutch John, Dutch John Airport, the flat at Mustang Junction, and the tops of Goslin and Bare Top Mountains. Even the margins of these tree-free areas showed evidence of advancing pinyon and juniper.

Riparian Forests and Meadows

Riparian forests and meadows occur at all elevations on the Ashley NF. Due to this range of distribution there is a high level of both community and species diversity in these vegetation types. In fact, structural diversity of these riparian communities exceeds that of all other vegetation types on the Forest. This composition and structural diversity is a function of both deciduous and coniferous trees. For example, at higher elevations aspen is the most common tree species in these riparian forests, and at lower elevations other deciduous species are found. These lower elevation riparian forests are the only vegetation community where deciduous species other than aspen are a dominant forest component. These deciduous tree species include narrowleaf cottonwood, box elder, and sometimes bigtooth maple. Coniferous species include ponderosa pine, limber pine, lodgepole pine, Douglas-fir, blue spruce, subalpine fir, and Rocky Mountain juniper.

In addition to the tree component in these riparian forests, tall shrubs and low trees such as thinleaf alder, western birch, Bebb's willow, Scouler willow, and caudate willow add an additional layer. Other shorter shrubs including Booths willow, Drummonds willow, Geyers willow, red osier dogwood, and woods rose contribute another layer of vegetation, and an herbaceous layer of numerous grasses, sedges, and forbs provide yet another diverse layer under the woody component of these communities.

Trend of both riparian areas and upland meadows is toward conifer dominance. This trend is a process that has likely been active in the past and is occurring at various stages over the landscape. Currently, deciduous trees, shrubs, and herbaceous species are well

represented in most areas even with conifer encroachment. However, with the absence of fire, coniferous trees can be expected to continue to increase, and eventually reduce the deciduous trees, shrubs, and herbaceous species in these meadows. This could result in a reduction of seral stage variation and structural diversity. However, the diversity of seral stages across the Forest in these riparian forests indicates that this ecosystem is currently in a sustainable and resilient condition.

Salt Desert Shrub

Weather, particularly the amount and timing of precipitation, is the dominant process controlling vegetation type dynamics and the annual wide shifts in species cover and production in salt desert shrub communities. Years of low precipitation and particularly low spring and early summer precipitation are marked by low expression of herbaceous species and sub-shrubs such as green molly and winterfat; or there might be a dieback of plants in extended periods of low precipitation. Years of abundant spring and/or early summer precipitation are marked by abundant growth of needle-and-thread, Indian ricegrass, squirreltail, and the vigorous growth of shrubs.

Currently, existing desert shrub communities are distributed on different soil, geologic, and geomorphic features where they have found a niche. Grasses including needle-and-thread and Indian ricegrass are abundant on pediments and on sandy soils. Gardner saltbush is dominant on flats of heavy clay soils. Spiny hopsage is common to dominant on wind-sand and some slopewash landforms. Less common and comparatively rare plants are found on semi-barren exposures of the Green River Formation where the characteristics of erosion exceed soil development. These plants are most common where the landscape dominant species such as sagebrush and shadscale are lacking or infrequent.

Trends in these desert shrub communities will continue to reflect the wide variation in response to timing and amount of precipitation associated the ecological history of these landscapes. The major change that will alter the current trend of these communities is invasive plant species. For example, cheatgrass has become the driving force in plant community dynamics in desert shrub communities in many parts of the West. This plant and its associated frequent fire regime present a major risk to the plant communities of desert shrublands on the Forest. Some of the plant communities of this area are not adapted to fire, and the frequent fire return interval associated with cheatgrass driven systems could greatly alter or eliminate these communities. In addition, other species of invasive plants such as halogeton have become a major threat to plant community composition and dynamics.

Invasive Plant Species

Invasive plant species or noxious weeds pose a major threat to native plant communities on National Forests and adjacent lands. About 6,080 acres on the Ashley NF are infested by about 13 different species of noxious weeds.

Table 4-5. Acres infested by noxious weeds on the Ashley NF

Species	Number of Sites	Infested Acres
Russian knapweed	136	180
Whitetop	86	152
Musk thistle	697	2,218
Spotted knapweed	29	9
Canada thistle	379	2,800
Hounds tongue	6	5
Leafy spurge	1	0.001
Black henbane	4	0.4
Dyers woad	7	3
Perennial pepperweed	95	706
Dalmation toadflax	5	3
Yellow toadflax	2	0.01
Scotch thistle	12	4
Total	1,459	6,080

The infested acres described above were determined from a spatial Forest-wide inventory. This inventory indicates that major highways are typically the primary source for introduction of noxious weeds on the Ashley NF. New infestations of noxious weeds have been found along highways and other roads annually since a noxious weed inventory was implemented in the 1980s. Mud flats of reservoirs are another source of noxious weed introduction and spread. In addition, essentially everything that moves including wind and water can potentially influence the spread of noxious weeds.

There are some landscapes on the Ashley NF that are not currently affected by noxious weeds. Some of the factors that make noxious weeds relatively uncommon on these landscapes include high elevations, a cooler environment, a short growing season, few roads, and limited access.

Trend for invasive plant species is likely toward an increase in infestations and number of invasive plant species. Through the Ashley's noxious weed management program, the more aggressive noxious weeds such as dyer woad and spotted knapweed have been kept in check. However, it appears that future trend will be the introduction of other aggressive species and the expansion of existing infestations.

4.1.3. Disturbance Processes

Ecosystems are dynamic not stable, and most are either changing as they move into different successional stages or recovering from periodic disturbances (Dillon and others 2005). It is widely recognized that in order to maintain a resilient and diverse ecosystem, disturbances are necessary (Kaufmann and others 1994, Landres and others 1999). The major disturbances that occur most often in forest ecosystems are typically fire and insect epidemics, therefore these disturbances will be discussed below. However, other processes such as flooding, avalanches, and drought can also induce change or recovery in ecosystems.

Fire

Historically fire on the Ashley NF affected almost every ecosystem in varying degrees. Some fires affected thousands of acres. For example, a report by S.S. Stewart documented an extensive fire in the southeast portion of the Ashley NF in the lodgepole pine belt that burned across four townships (24 miles) during the year of 1879 (Ogle and Dummond 1997).

Wildfire has likely been suppressed on the Ashley NF for about a century. Assessments of existing conditions and monitoring studies on the Forest indicate that fire suppression has likely increased the fire return interval and fuel loads in coniferous forests and increased conifer encroachment in shrublands and grasslands. Trends modeled using VDDT under current management indicate that forest-wide fuel loads and conifer encroachment will continue to increase and seral aspen stands will continue to decrease with current fire suppression in these vegetation communities.

Fire return intervals and the state of existing vegetation as a fuel source for fires has been assessed on the Ashley NF using the Fire Regime Condition Class (FRCC) protocol, which is a standardized tool for determining the degree of departure from historical fire return intervals and the amount of fuel that historically existed within vegetation communities. Results from this assessment indicate that about 67% of Forest lands are in a condition that is moderately or highly different than would be expected under a natural disturbance regime with increasing fuel loads.

Insects

The effect of insects as disturbance agents in forest ecosystems is well documented in the current body of literature (Rogers 1996, Romme and others 2006, Negrón and others 2008). Bark beetles are native to western forests and generally survive in forests at endemic population levels. Some bark beetle species periodically increase to epidemic population levels due to the effects of extended drought and as forests age and become more dense (Schmid and Mata 1996). These periodic cycles of stand replacement and regeneration are ecological processes that have likely been occurring for thousands of years (Romme and others 2006, Schmid and Mata 1996).

Data from aerial detection surveys obtained by the U.S. Forest Service's Forest Health Protection program indicate that bark beetle mortality on the Ashley NF has been widespread and significant, similar to other forested areas in the Intermountain west. Vegetation types affected by mountain pine beetle include mixed conifer (69%), mixed conifer and aspen in rock/talus (14%), lodgepole pine (11%), and ponderosa pine (4%). Ashley NF bark beetle affected acreage from 2001-2008 is summarized in Table 4-6.

Table 4-6. Acres affected by insects on the Ashley NF.

Year	Douglas Fir Bark Beetle	Mountain Pine Beetle	Spruce Beetle	Subalpine Fir Mortality Complex	Pinyon Ips
2001	2,421	10,653	1,287	957	-
2002	1,519	16,985	15	878	-
2003	3,115	26,284	2,952	1385	3,822
2004	13,889	63,755	8,186	6,174	10,247
2005	33,141	41,325	-	1,779	-
2006	1,504	43,979	124	325	-
2007	11,205	84,812	1,496	565	-
2008	6,361	73,899	1,546	1,246	347
SUM	73,155	361,692	15,606	13,309	14,416
Cumulative Acres	60,423	170,247	14,295	11,999	13,224

Insect associated disturbance can be associated with changes in climate (e.g., extended periods of drought), wildfire, fire suppression, and extensive susceptible landscapes. Insect epidemics are a natural part of ecosystem processes; however fire suppression, harvest practices, and changes in climate do affect their frequency and scale on susceptible landscapes.

4.1.4. Watershed Function

Watershed function is an integration of geology, geomorphology, hydrology, soils, vegetation, and disturbance processes such as fire, insects, and disease. Each of these ecosystem elements affect watershed function in some way and have been described in detail for each landscape on the Ashley NF (USDA Forest Service 2009a). Some key conditions and trends related to watershed function include water developments (i.e. reservoirs, canals, and spring developments), roads and trails, recreation, grazing, and timber harvest.

Many small reservoirs are located on the Ashley NF, which have changed the hydrology of the watershed in which they occur by inundating or creating wet meadows, and changing downstream water flows and sediment transport. These reservoirs are often connected with canal systems that divert and transport water, in some cases, out of the natural drainage. Where canal systems have been built in loose, unconsolidated materials, leakage and failure of the canal structure is common. Springs that have been developed for livestock or domestic use have also altered hydrologic processes and flow patterns. Road and trails that are not properly designed or that occur in sensitive soils or substrates can be a source of erosion and sedimentation. Roads and trails often capture runoff and transport the flow, along with sediment into nearby streams or water bodies. Where roads have cut into the erosive side-slopes, slope stability and mass movement has also occurred.

Motorized vehicle use is occurring on unauthorized routes in many areas of the Forest. These routes are particularly susceptible to erosion because they are user created and not designed for a specific route, often occur on steep slopes, and do not have any drainage

features. These activities are contributing to increased bare ground, erosion, and sedimentation of nearby streams and water bodies. All terrain and four-wheel drive vehicle use during wet conditions exacerbates erosion problems, creating ruts, gullies, and increased rill erosion. Dispersed camping has created areas of soil compaction and increased bare ground in localized areas.

Past and present patterns of grazing, including the cumulative effects of sheep, cattle, and wildlife have increased erosion from wind and water in some areas, including sensitive alpine areas, wet meadows, riparian areas, and stream corridors. Some effects observed from heavy grazing of livestock and wildlife have been decreased streambank stability, widening and shallowing of stream dimensions, and increased sedimentation. These effects are similar to those observed elsewhere across the West (Platts 1991). The soils in dry meadows are also subject to compaction and erosion from use by wildlife and livestock, which has occurred in many places across the Forest. However, on the Ashley NF, these impacts appear to be localized and are not reflective of overall watershed conditions.

Timber harvesting on the Ashley NF has historically produced increases in water yield and has increased peak flows during spring snowmelt, as documented in a paired watershed study at Brownie Creek and North Fork Dry Fork (Burton 1997). Roads and skid trails have altered drainage pathways and increased erosion and sedimentation. The practice of piling and burning following harvest has generally resulted in loss of soil biota and productivity. In addition, timber-harvesting activities with heavy equipment in areas with a high water table have resulted in rutting, puddling, and soil compaction. Forest Plan guidelines and best management practices have helped to minimize these impacts, which generally occur in localized areas, and are not reflective of the overall watershed condition or function.

4.1.5. Species Diversity

The assessment of species diversity on the Ashley NF began as a collaborative process that involved three other Utah Forests and guidance from The Nature Conservancy. The first step in the process was to identify the species whose range could occur within the Ashley NF. Each species list was developed using a set of rules (USDA Forest Service 2009b) and was specific to each Forest.

Once the species lists were developed, information such as taxonomy, distribution, habitats, abundance, and risk factors was collected for each species. This information was used to further filter species on the original list (USDA Forest Service 2009b). Population and habitat trends were then reviewed for all species retained through the screening process, which included federally listed Threatened or Endangered Species (TE), Species of Concern (SOC), and Species of Interest (SOI). These categories were defined as:

- **Threatened or Endangered** – Species listed by the Department of Interior, U.S. Fish and Wildlife Service or the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, as threatened or endangered.

- **Species of Concern** – Species for which management actions may be necessary to prevent listing under the Endangered Species Act (ESA).
- **Species of Interest** – Species for which management actions may be necessary or desirable to achieve ecological or other multiple-use objectives.

Screening Process

To identify federally listed species applicable to the planning area, U.S. Fish and Wildlife Service lists of species with ESA status were obtained. The sources used consisted of threatened, endangered, and proposed species applicable to counties located within the Ashley NF and FGNRA (USFWS 2007, USFWS 2008). The result was an array of federally listed species that occur, or potentially occur within the Ashley NF (Table 4-7). No *Proposed* species presently occur on the Ashley NF.

To identify SOC, NatureServe Explorer (NatureServe 2008) was used as the source for identifying species global, national, and state rankings. These rankings were used to determine which species were most at risk. NatureServe was also the source for determining potential state occurrence of species within either Utah or Wyoming, and for more detailed species locations, such as by watershed or county. More specific species locations in association with the Ashley NF were determined using plotted GIS shapefiles and coverages from the following sources:

- USDA Forest Service NRIS Fauna wildlife database (NRIS Fauna 2008)
- Utah Natural Heritage Program species database (UNHP 2004)
- Wyoming Natural Diversity database (WYNDD 2008)

Often times, species occurrence within the state was noted by NatureServe, but no further information was provided or found within the database sources listed above. In these cases, other sources were accessed, including online museum collections, available literature, or other established online databases. These sources are referenced within individual species' summaries. Additional information concerning Utah and Wyoming State conservation rankings (UDWR 2005, WGF 2005c), Partners in Flight rankings (Parrish et al. 2002) and USFWS Birds of Conservation Concern (USFWS 2002) were also reviewed and included within the query results. Species of Concern were further screened based on the following:

- There are no known occurrences or suitable habitat of the species on the forest, grassland, prairie, or other comparable administrative unit.
- Species are secure within the plan area.
- Species are not affected by management or potential plan components.

As a result of this screening process, the species in Table 4-7 under *Species of Concern* were carried forward.

The process and sources used to query for SOI were similar to those identified for SOC species. However, while NatureServe rankings provided an initial basis for species identification, species with Utah and Wyoming CWCS ranking status, as well as Partners

In Flight Priority species, and USFWS Birds of Conservation Concern were also included in the initial list, regardless of NatureServe rank. Potential species with socioeconomic and/or public interest were also considered as SOI (Table 4-7).

Species and Habitat Condition and Trend

Population and habitat trends were reviewed for all species retained as TE, SOC, and SOI. Population trends were unavailable for a large percentage of species, particularly those that are rare, but not federally listed. Primary sources for population trend information included the Utah Division of Wildlife Resources' Comprehensive Wildlife Conservation Strategy, USFWS species' associated conservation documents, and other available sources.

Habitats associated with these species varied in magnitude from one local account (Utah amphipod) to a combination of broad-ranging vegetation types (northern goshawk and mule deer). Specific condition and trend information for rare, non-federally listed species was difficult to determine as it may have been many years since condition was documented, if at all. In 2006, the Ashley NF began the process of modeling a number of vegetation types prominent on the Forest. The Vegetation Dynamics Development Tool, which classifies vegetation by cover type and structure class, allows input of environmental variables, and produces potential outcomes in the form of vegetation type/structure class acre values at the landscape level was used to assess habitat trend. The results of that modeling effort were summarized in section 4.1.2 *Vegetation Diversity* of this report and have been incorporated into species habitat trend projections where applicable in Table 4-7.

Table 4-7. Habitat trend projections for animal species recommended to be carried forward in the Forest planning process.

Federally-Listed Species		
Taxon	Habitat	Trend Summary
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	Occurs in varied habitat, consisting of mature montane forest and woodland, shady wooded canyons, and steep canyons.	<u>Population Trend</u> : Unknown (UDWR 2005). <u>Habitat Trend</u> : Structural diversity in mixed conifer and Douglas-fir will decrease, with a trend toward increasing mature and old structure with increased fuel loads.
Humpback chub (<i>Gila cypha</i>)	Mainstem riverine habitats with a variety of habitats ranging from pools with turbulent to little or no current.	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Unknown. Apparently, the primary threats to this species are hybridization, competition, habitat fragmentation, and limited populations (UDWR 2005).
Bonytail chub (<i>Gila elegans</i>)	Mainstem riverine habitats	<u>Population Trend</u> : Unknown <u>Habitat Trend</u> : Unknown. Apparently, the primary threats to this species are hybridization, competition, habitat fragmentation, and limited populations (UDWR 2005).

Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Mainstem and tributary riverine habitats.	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Unknown. Apparently, the primary threats to this species are competition, habitat fragmentation, water diversions, limited populations, and long travel distance during spawning (UDWR 2005).
Razorback sucker (<i>Xyrauchen texanus</i>)	Warm-water reaches of larger rivers in the Colorado River basin.	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Unknown. Apparently, the primary threats to this species are hybridization, competition, habitat fragmentation, and limited populations (UDWR 2005).
Black-footed ferret (<i>Mustela nigripes</i>)	Open, grass-forb habitats containing prairie dog towns.	<u>Population Trend</u> : One population in Utah as a result of ongoing reintroduction efforts (UDWR 2005). <u>Habitat Trend</u> : Unknown. Grassland habitats not modeled.
Canada Lynx (<i>Lynx canadensis</i>)	Engelmann spruce, white fir, subalpine fir, and lodgepole pine above 6,500 feet	<u>Population Trend</u> : Unknown. Presumed extirpated from Utah. <u>Habitat Trend</u> : Structural diversity in mixed conifer and Douglas-fir will decrease, with a trend toward increasing mature and old structure with increased fuel loads. The amount and distribution of subalpine fir will likely vary through time as seral stages advance. Lodgepole pine stands in the western portion of the Ashley NF will trend toward mature and old structure, while those in the eastern portion will maintain a high level of structural diversity.
Species of Concern		
Taxon	Habitat	Trend Summary
Utah needletly (<i>Perlomyia utahensis</i>)	Springs and rheocrenes	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Current condition and trend of habitats and sites containing this species are unknown.
Utah amphipod (<i>Stygobromus utahensis</i>)	Caves	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Current conditions and trends within the cave containing this species are unknown.
Nokomis fritillary (<i>Speyeria nokomis</i>)	Streamside meadows and seepage areas containing <i>Viola nephrophylla</i>	<u>Population Trend</u> : Unknown. <u>Habitat Trend</u> : Some springs have undergone water diversion and development. The extent of impacts to available habitat is unknown.
Eureka mountainsnail (<i>Oreohelix eurekaensis</i>)	Relatively open areas of limestone with shrub/Douglas-fir overstories	<u>Population Trend</u> : Unknown. Currently four widely separated population in Utah. <u>Habitat Trend</u> : Current condition of the Ashley NF site is stable and trending toward desired condition. In 2005 the site was reported to be fenced and monitored (USFWS 2005).
Colorado River cutthroat trout (<i>Oncorhynchus clarki pleuriticus</i>)	Headwater streams and mountain lakes with cool, well-oxygenated water	<u>Population Trend</u> : Upward for lakes, and stable to downward for streams. (USDA Forest Service 2006a) <u>Habitat Trends</u> : Stable to improving (USDA Forest Service 2006a)
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Large trees for nesting, Open water with adequate fish populations	<u>Population Trend</u> : Increasing (UDWR 2005). <u>Habitat Trend</u> : Structural diversity in mixed conifer and Douglas-fir will decrease, with a trend toward increasing mature and old structure with increased fuel loads.

<p>Greater sage-grouse (<i>Centrocercus urophasianus</i>)</p>	<p>Sagebrush</p>	<p><u>Population Trend:</u> It is believed that the greater sage grouse population on the Forest is viable, stable, and in the last five to ten years there appears to be a slight upward trend. It also appears that sage grouse are well distributed throughout its limited range on the Forest. (USDA Forest Service 2006a)</p> <p><u>Habitat Trend:</u> Mountain sage associated with PJ is predicted to be displaced in the long-term. Mountain sagebrush associated with aspen indicates a general stable trend.</p>
<p>Species of Interest</p>		
<p>Taxon</p>	<p>Habitat</p>	<p>Trend Summary</p>
<p>Midget faded rattlesnake (<i>Crotalus viridis concolor</i>)</p>	<p>Primary focus habitat is rock outcrops used for denning</p>	<p><u>Population Trend:</u> Unknown.</p> <p><u>Habitat Trend:</u> Unknown.</p>
<p>American marten (<i>Martes americana</i>)</p>	<p>Montane and subalpine conifer with dense overstory and adequate densities of down logs</p>	<p><u>Population Trend:</u> Abundance in Utah is considered low (UDWR 2005). Population trend unknown.</p> <p><u>Habitat Trend:</u> Structural diversity in mixed conifer and Douglas-fir will decrease, with a trend toward increasing mature and old structure with increased fuel loads. The amount and distribution of subalpine fir will likely vary through time as seral stages advance. Lodgepole pine stands in the western portion of the Ashley NF will trend toward mature and old structure, while those in the eastern portion will maintain a high level of structural diversity. High fuel loadings are predicted for some mixed conifer landscapes.</p>
<p>Townsend's big-eared bat <i>Corynorhinus townsendii</i>)</p>	<p>Primary focus habitat is caves and abandoned mines</p>	<p><u>Population Trend:</u> Moderately common in Utah, thought to be declining (UDWR 2005).</p> <p><u>Habitat Trend:</u> Past closing and sealing of abandoned mines and caves has eliminated a number of known historic maternity and hibernating colonies in Utah. More recently, habitats are actively surveyed following a pre-survey protocol to protect bat roosts (Pierson et al. 1999 in Oliver 2000). The trend in frequency of roost disturbance is unknown.</p>
<p>Wolverine (<i>Gulo gulo</i>)</p>	<p>Subalpine and montane conifer forest with little or no human influence</p>	<p><u>Population Trend:</u> Possibly extirpated from Utah. Recent sightings suggest it may still be extant within the state (UDWR 2005).</p> <p><u>Habitat Trend:</u> For alpine, photographic comparison in some areas suggest a slow upward movement of treeline in the past 40-150 years, with isolated patches of young conifer above treeline in the past 20 years. This may be a part of natural fluctuations. The amount and distribution of subalpine fir will likely vary through time as seral stages advance. Engelmann spruce will likely continue to be driven by natural ecological processes due to being located primarily in wilderness areas.</p>
<p>Rocky Mountain bighorn sheep (<i>Ovis canadensis</i>)</p>	<p>Open habitats with adequate escape cover</p>	<p><u>Population Trend:</u> Unknown.</p> <p><u>Habitat Trend:</u> For alpine, photographic comparison in some areas suggest a slow upward movement of treeline in the past 40-150 years, with isolated patches of young conifer above treeline in the past 20 years. This may be a part of natural fluctuations.</p>

<p>American Three-toed Woodpecker (<i>Picoides tridactylus</i>)</p>	<p>Coniferous forests above 8,000 feet. Foraging can depend on available insects in bug-killed and fire-killed trees.</p>	<p><u>Population Trend:</u> Considered common in Utah, but population trends are difficult to establish because occurrences are sporadic and irruptive (UDWR 2005).</p> <p><u>Habitat Trends:</u> The level of conifer mortality due to wood-boring beetles is difficult to predict. Large beetle epidemics are unlikely within Engelmann spruce. Fire suppression has led to increased fuel levels and lengthened fire return intervals in lodgepole pine.</p>
<p>Lewis's Woodpecker (<i>Melanerpes lewis</i>)</p>	<p>Open ponderosa, riparian, and possibly aspen forests.</p>	<p><u>Population Trend:</u> Thought to be declining from historic levels (Bosworth 2003). The species has been extirpated from the Wasatch Front; trend estimates are inconclusive (UDWR 2005).</p> <p><u>Habitat Trends:</u> Because fires have been infrequent over the past 100 years, understory saplings have increased. Modeling indicates a long-term trend toward larger trees, with persistence of understory; thereby increasing fire access to canopies. Management may be required to reestablish open, park-like stands. Riparian forests currently contain a high level of structural diversity, and considered sustainable and resilient. However, trend is toward conifer dominance with the absence of fire.</p>
<p>Northern goshawk (<i>Accipiter gentilis</i>)</p>	<p>Large diameter conifer and aspen forests for nesting. Open understory conifer for foraging.</p>	<p><u>Population Trends:</u> Occupancy has fluctuated since the date that data collection began; however, based on statistical analysis, the goshawk population trend across the Forest appears to be stable (Ashley National Forest unpublished data 2003). It also appears that the Forest supports a viable goshawk population and continues to provide well-distributed habitat across the Forest for this species (USDA Forest Service 2006a).</p> <p><u>Habitat Trends:</u> Because fires have been infrequent over the past 100 years, understory saplings have increased. Modeling indicates a long-term trend toward larger trees, with persistence of understory; thereby increasing fire access to canopies. Management may be required to reestablish open, park-like stands. For seral aspen, trends show a continual decline in structural diversity with stands moving toward mature and older stages with little or no aspen recruitment. Persistent aspen trend is stable with good structural diversity.</p>
<p>Peregrine Falcon (<i>Falco peregrinus</i>)</p>	<p>Cliff habitats for nesting, open areas and water for foraging</p>	<p><u>Population Trend:</u> Increasing, but still rare in Utah (UDWR 2005).</p> <p><u>Habitat Trend:</u> No trend information is available for cliff and water habitats.</p>
<p>Bear Lake sculpin (<i>Cottus extensus</i>)</p>	<p>Endemic to the benthic layers of Flaming Gorge Reservoir</p>	<p><u>Population Trend:</u> Estimated to number in the millions (UDWR 2005).</p> <p><u>Habitat Trend:</u> Stable</p>
<p>Rainbow trout (<i>Oncorhynchus mykiss</i>)</p>	<p>Lakes, streams, rivers</p>	<p><u>Population Trend:</u> Stable</p> <p><u>Habitat Trend:</u> Stable and trending towards desired condition (USDA Forest Service 2006a).</p>
<p>Brown trout (<i>Salmo trutta</i>)</p>	<p>Larger streams and rivers</p>	<p><u>Population Trend:</u> Stable</p> <p><u>Habitat Trend:</u> Stable and trending towards desired condition (USDA Forest Service 2006a).</p>

<p>Brook trout (<i>Salvelinus fontinalis</i>)</p>	<p>Lakes and streams</p>	<p><u>Population Trend:</u> Stable <u>Habitat Trend:</u> Stable and trending towards desired condition (USDA 2006a).</p>
<p>Rocky Mountain elk (<i>Cervus canadensis</i>)</p>	<p>Variety of habitats, including grasslands, shrublands, forest.</p>	<p><u>Population Trend:</u> Herds have increased dramatically in the past 30 years, but stable for the past 10 years (UDWR 2005c). It also appears that the elk population on the Forest is stable to increasing and sustains an annual harvest and remains viable (USDA Forest Service 2006a). <u>Habitat Trends:</u> Fire suppression has likely led to increased conifer encroachment in grasslands and shrublands. Most forest types are trending to increased density.</p>
<p>Mule deer (<i>Odocoileus hemionus</i>)</p>	<p>Variety of habitats, but sagebrush, mountain shrub with good structural diversity for primary forage.</p>	<p><u>Population Trends:</u> Widespread in Utah in high numbers, but experiencing recent declines due to drought (UDWR 2005). It also appears that the mule deer population on the Forest is stable to slightly decreasing, but sustains an annual harvest and remains viable (USDA Forest Service 2006a). <u>Habitat Trends:</u> Mountain sage associated with PJ is predicted to be displaced in the long-term. Mountain sagebrush associated with aspen indicates a general stable trend, but a trend toward older age-classes in most areas due to lack of fire. Mountain shrub communities are currently in the mid to late seral stages and at risk to conifer and PJ encroachment. Modeling indicates eventual displacement by pinyon-juniper in all areas except the FGNA.</p>

Table 4-8. Habitat trend projections for plant species recommended to be carried forward in the Forest planning process.

<p>Federally-Listed Species</p>		
<p>Taxon</p>	<p>Habitat</p>	<p>Trend Summary</p>
<p>Ute ladies' tresses (<i>Spiranthes diluvialis</i>)</p>	<p>Riparian</p>	<p>Population Trends: Known on Ashley NF only along the Green River below Little Hole where the species appears to be stable. Habitat Trends: Appears to be stable.</p>
<p>Species of Concern</p>		
<p>Taxon</p>	<p>Habitat</p>	<p>Trend Summary</p>
<p>Graham columbine (<i>Aquilegia grahamii</i>)</p>	<p>Weber sandstone, cliffs ledges, and sandy drip line of wet cliffs and ledges</p>	<p>Population Trends: Populations on the Forest appear to be stable and secure and at levels consistent with potential habitat (Huber 1995). Habitat Trends: Stable due to cliff habitat.</p>
<p>Nelson's milkvetch (<i>Astragalus nelsonianus</i>)</p>	<p>Sparsely vegetated, eroding slopes of or associated with the Wasatch Formation</p>	<p>Population Trends: Appear to be stable Habitat Trends: Appear to be stable</p>
<p>Ownbey's thistle (<i>Cirsium ownbeyi</i>)</p>	<p>Riparian to desert shrub communities. Also on Green River Formation</p>	<p>Population Trends: Only known population is in the Fire Hole-Chimney Rock area of the Flaming Gorge National Recreation Area (Refsdal 1996). There has been concern that insects released to attack musk thistle also attack this species.</p>

		Habitat Trends: Stable due to ecological amplitude.
Evert's waferparsnip (<i>Cymopterus evertii</i>)	Rim of Ashley Gorge with scattered Douglas-fir, limber pine, and other trees	Population Trends: Only known population on Ashley NF is on the rim of Ashley Gorge. Habitat was surveyed on 29 August 2006. Plants were found restricted to the rim of the gorge on a limestone formation for a distance of about 300 m. Number of plants of this population is in the hundreds or thousands. The population appears stable. Habitat Trends: Stable.
Clustered lady's-slipper (<i>Cypripedium fasciculatum</i>)	Shade of coniferous forests; found in duff of moderately dense to dense lodgepole pine forests with most trees of 3-8 inch dbh where understory species are sparse and mostly limited to scattered plants of this species and a few others	Population Trends: There are many populations in the eastern Uinta Mountains. Populations extend over a range of about 25 miles on both the north and south slopes of the mountains at the elevational band listed above (Franklin 1990a). Habitat Trends: Stable. Although trend toward Engelmann spruce and subalpine fir dominated forests is not favorable for this species. Number of populations and extent of area of the species, strongly indicates the species can be sustained through periodic fire.
Rockcress draba (<i>Draba globose</i>)	Alpine slopes and summits of Uinta Mountains on the Uinta Bollie Landtype Association	Population Trends: There many small populations of this plant well dispersed across the alpine of the Uinta Mountains. This plant can be expected to be secure (Huber 1995). Habitat Trends: Secure and stable due to the many populations well dispersed across the alpine of the Uinta Mountains.
Untermann's daisy (<i>Ergeron untermannii</i>)	Fine textured sandy-silty soil and flat, angular fragments that have weathered from the sandstone, shale, and siltstone that make up the Uinta Formation (Franklin 1989) and Green River Formation mostly on windswept, sparsely vegetated ridge tops (occasionally on side slopes) within the pinyon-juniper, Douglas-fir, and limber pine-bristle cone pine belts	Population Trends: Results of field surveys indicate a stable population trend (Franklin 1989). Follow-up study in 2005 indicates stable populations. Habitat Trends: Field studies indicate habitat is stable.
Huber's pepperplant (<i>Lepidium huberi</i>)	Huber (1995) surveyed most of the potential habitat on the Ashley National Forest. Additional populations were found on the north side of Red	Population Trends: Populations are relatively small (4 to 5 locations), but in areas of low activity (Huber 1995). More populations found after 1995 indicate stable trend. Habitat Trends: Stable and secure due to the narrow, steep, rocky canyons where this plant is found.

	Mountain in 2006	
Goodrich's blazingstar (<i>Mentzelia goodrichii</i>)	Escarpments of Green River Formation and perhaps Uinta Formation	Population Trends: Populations appear well adapted and stable. Habitat Trends: Stable due to steep, rocky habitat.
Uinta poppy (<i>Papaver uintaense</i>)	Talus slopes and windswept passes and saddles in Red Pine Shale and quartzite, from about 11,100-12,800 ft elevation on Uinta Bollie2 and less abundantly on Uinta Bollie 1 landtypes.	Population Trends: One of the more restricted and uncommon alpine plants of the Uinta Mountains. It is recorded for only about 15 sites on the Ashley NF, and it is not abundant at some sites (Franklin 1990). Appears stable. Habitat Trends: Stable due to rocky habitat.
Stemless beardtongue (<i>Penstemon acaulis</i>)	Mixed desert shrub, black sagebrush, Wyoming big sagebrush, and pinyon-juniper communities	Population Trends: Stable. Appears to be able to persist with disturbance. Habitat Trends: Currently stable.
Opal phlox (<i>Phlox opalensis</i>)	Reported to be on the Forest, and specimens collected from South Valley Area near Flaming Gorge in 2009 appear to be this species (Resdal 1996)	Population Trends: 2009 collections from Ashley NF appear to belong to this species. Habitat of where the 2009 collections were found indicates considerable potential for this species on the Forest. Habitat Trends: Appear to be stable.
Narrow-leaved skeletonplant (<i>Stephanomeria tenuifolia</i> var. <i>uintaensis</i>)	Open slopes and with scattered aspen, ponderosa pine, and other coniferous trees on the Stream Canyon Landtype Association. More common in openings than under trees	Population Trends: Appear to be stable. Habitat Trends: Much of the known habitat for this species is on the Ashley NF. The habitat appears stable for this species.
Green River greenthread (<i>Thelesperma caespitosum</i>)	Badlands of Green River and Uinta Formations	Population Trends: Stable. Surveys by Forest Service and other botanists have resulted in discovery of several populations in the Bad Land Cliffs (Fertig 1995) and head of the Antelope drainage. Habitat Trends: Currently stable. However, possible threat to habitat includes invasive species such as cheatgrass and halogeton.
Species of Interest		
Taxon	Habitat	Trend Summary
Showy pussytoes (<i>Antennaria pulcherrima</i>)	Calcareous bog	Population Trends: Known only on the Ashley NF in a calcareous bog or fen in South Fork of Rock Creek. Therefore, sustainability of this widespread North American species will depend on populations other than those on the Ashley NF.

		Habitat Trends: Stable.
Tundra draba (<i>Draba ventosa</i>)	High elevation talus and other rocky places in the Uinta Mountains	Population Trends: Unknown. Known on the Ashley NF by a single collection from the Blind Stream-Rock Creek divide of the Uinta Mountains. Habitat of this species indicates at least a few more populations can be expected on the Ashley NF. Habitat Trends: Likely stable due to rocky habitat.
Narrow-leaf evening primrose (<i>Oenothera flava</i> var. <i>acutissima</i>)	Dry meadows, ephemeral pools, and especially ephemeral, rocky streams in the ponderosa pine and lodgepole pine belts of the Uinta Mountains	Population Trends: With many populations scattered over a 100 mile range, this plant that is tolerant of considerable disturbance is indicted to be secure. Habitat Trends: Stable due to widespread habitat.
Alpine locoweed (<i>Oxytropis deflexa</i> var. <i>pulcherrima</i>)	Subalpine and alpine meadows and open slopes. It is more common in limestone areas than elsewhere in the Uinta Mountains (Huber 1995)	Population Trends: Stable. Populations appear to persist concurrent with other uses such as livestock grazing. Habitat Trends: Stable.
Cleburn beardtongue (<i>Penstemon cleburnei</i>)	Desert shrub communities of the Flaming Gorge National Recreation Area	Population Trends: The plant is widespread with numerous scattered populations (Refsdal 1996). Habitat Trends: Currently stable. However, possible threat to habitat includes invasive species such as cheatgrass and halogeton.
Marsh cinquefoil (<i>Potentilla palustris</i>)	Wet areas including floating bogs where runners of this plant extend a few feet out into open water	Population Trends: Unknown due to few populations. Habitat Trends: As long as the wetland habitat of this species remains wetland in nature, there appears to be little threat to this species in this area.
Skyline townsendia (<i>Townsendia montana</i>)	Semibarrens of Green River Formation	Population Trends: Unknown due to lack of inventory. Habitat Trends: Likely stable. However, possible threat to habitat includes invasive species such as cheatgrass and halogeton.

4.2. Potential Risks to Ecosystem Sustainability

Invasive plant species

Invasive species including noxious weeds pose a major threat to native plant communities on the Ashley NF and adjacent lands. The aggressive nature of most invasive species to colonize large areas and reduce the plant diversity of an area has been well documented, and is a potential risk to almost every ecosystem on the Ashley NF.

Cheatgrass is one species that can have a major affect on certain ecosystems on the Ashley NF in the future. The introduction and spread of cheatgrass can not only reduce diversity, but can also drastically alter fire regimes. Fire frequencies of less than 10 years

are common in cheatgrass driven systems, and the effect of an increased fire frequency in some plant communities on the Ashley NF is a major threat. For example, fire frequencies of less than 20 or even 30 years will prevent the establishment of Wyoming big sagebrush communities. Fire frequencies of less than 100 years will prevent pinyon/juniper communities from developing beyond an early-seral stage. Mountain shrub communities dominated by alder-leaf mountain mahogany and serviceberry will likely persist under fire frequencies of less than 20 or 30 years, however, some species of these communities, including bluebunch wheatgrass, might be decreased at intervals of less than 20 years.

Fire suppression

Fire at the frequency and magnitude of the past greatly influenced the current successional patterns and structural diversity on many landscapes and vegetation communities on the Ashley NF. The types of fire regimes that occurred historically will likely be a challenge for current management to implement because urban interface, an increasing population, and increasing recreation use are social trends that have generally lead to opposition to smoke and the visual impacts of burns. Therefore, continued fire suppression could eventually push fire return intervals, conifer displacement, and available fuels to levels that were not common historically.

Water quality

Water quality can be impaired by various management activities, which can affect aquatic habitats on the Forest. Some of these activities include impacts from agricultural return flows containing excess salts and phosphorus, livestock use on streams and water bodies, sediment transport and load from upslope sources and degraded stream networks, subsurface pollution, and ground disturbance in sensitive areas.

Erosion

Various management activities on the Forest can cause erosion, which can quickly reduce soil cover and stability. Some of these activities include timber harvesting on steep slopes or areas with active mass wasting, road construction where roadcuts can produce planar block glides, and grazing by both livestock and wild ungulates on steep sparsely vegetated slopes.

Atmospheric pollutants

Alpine areas are sensitive to pollutants transported by the air and deposited in soil and water. Impacts from atmospheric pollutants include changes in carbon/nitrogen ratios and acid deposition in high elevation lakes. For example, atmospheric pollutants such as nitrates could change the carbon/nitrogen ratios in alpine soils, which may affect biotic soil communities and nutrient uptake by plants.

4.3. 1986 Forest Plan Desired Future Conditions

4.3.1. Wildlife and Fish

Desired future condition for Wildlife and Fish in the 1986 Forest Plan states that the Forest will be managed to maintain vegetative diversity, providing wildlife habitat for a

large variety of wildlife species. Special emphasis will be given to habitat such as winter range, riparian zones, reproductive areas, cliff habitat, talus, caves, snags, aquatic systems, and old growth timber. Winter foraging areas for big game will begin to show an increase in the amounts of shrubs and other plants available for forage.

Goals for Wildlife and Fish in the 1986 Plan are:

- Manage fish and wildlife habitat to maintain or improve diversity and productivity.
- Involve concerned government agencies, environmental organizations, and special interest groups in wildlife and fisheries management program.

4.3.1.1. Major changes since 1986

The threatened and endangered status of some species has changed since the 1986 Forest Plan. The bald eagle and peregrine falcon were removed from the federally threatened and endangered species list and the Canada lynx was added to this list.

Laws and regulations have been added or updated since the last planning period. Conservation plans for both Utah and Wyoming have been updated. A northern goshawk and lynx conservation strategy amended the 1986 Forest Plan. Lynx conservation areas have also been delineated on the Forest and are associated with specific management guidelines.

In addition to these bureaucratic changes, ecosystems have changed over the last 23 years. For example, non-native invasive plants and aquatic species have altered terrestrial and aquatic habitats, effects from beetles have changed the structure of coniferous forests, fire suppression has increased fire return intervals and disturbance cycles, and conifer encroachment has affected shrublands.

4.3.1.2. Need for Change

The Forest Plan needs to be revised to comply with new laws, regulations, and management direction. The revised plan should also incorporate updated state and federal strategies that have been developed to sustain and enhance wildlife populations, especially for species that have recently been federally listed like the Canada lynx or sensitive species such as the greater sage-grouse or Colorado River cutthroat trout.

Current research regarding wildlife populations and their habitats need to be incorporated into a revised plan. For example, the Ashley NF has been collecting data on the northern goshawk since 1991. These data could be used to determine sustainable conditions for coniferous forests.

The level of activities and issues on the Forest are different and more complex than when the 1986 Forest Plan was written. For example, dispersed camping has increased along riparian areas, which has impacts on aquatic habitat. All terrain vehicle (ATV) use has increased sharply, which has likely affected breeding, nesting, and calving activities as well as possibly fragmented habitat and created more opportunities for harassment of

wildlife. Oil and gas development has increased on the Forest and the effects of these activities are still unknown on species such as sage-grouse, deer, elk, and pronghorn.

Generally, most of the objectives, standards, and guidelines in the 1986 Forest Plan need to be reevaluated and replaced with more meaningful and measurable objectives. Many of the standard and guidelines are either too broad or too specific to be useful. The goals, objectives, strategies, and guidelines need to be updated to reflect new law and regulations, collaborative efforts, and the best available science.

4.3.2. Timber

Desired future condition for Timber in the 1986 Forest Plan states that stands will change from predominately mature and overmature to younger age classes. Even aged management will be practiced in all species except in special areas. Uneven age management will be applied to portions of stands where practical to improve or maintain diversity. Visual quality objectives will be maintained according to management area direction.

The goal for Timber in the 1986 Plan is:

- Optimize wood fiber production to meet public demands consistent with other resource objectives and environmental constraints.

4.3.2.1. Major changes since 1986

There has been a decrease in timber harvests since the 1986 Plan. The beginning of the first planning period (1986) was dominated by the on-going bark beetle epidemic in lodgepole and ponderosa pine. The management emphasis then was on salvaging the mortality and trying to convert older stands to younger ones in order to make these two forest types less susceptible to beetles. There were considerations given to bark beetle risks in the Engelmann spruce forest type but to a much less degree than to the lodgepole and ponderosa pine. There was a strong demand for forest products from local industry at this time. The annual sale quantity (ASQ) was at 21,000 Mbf at the beginning of the plan period and is much less currently. Over the last five years the average annual volume removed has been 5,407 Mbf. This includes personal-use firewood (1,827 Mbf/year). Of the 5,407 Mbf removed 1,024 Mbf was live or 18% of the total. Of the 1024 Mbf of live volume removed per year 555 Mbf was posts and poles or 54%.

Since 1986 about 52% of the Ashley NF has been classified as inventoried roadless, this designation has precluded almost all types of timber harvest in these areas. Also, in the past, timber stand improvement work aggressively pursued primarily pre-commercially thinning in the lodgepole pine type. Since 1998, pre-commercial thinning of lodgepole pine has been precluded by the Lynx Conservation Strategy Amendment to the Forest Plan in areas designated as Lynx Analysis Units.

Aspen in the West and on the Ashley NF has been declining historically. The Intermountain Research Station estimated in 1995 that aspen on the Ashley NF has declined from approximately 322,000 acres to approximately 101,000 acres. However, monitoring by Forest personnel and on-going stand examinations has shown that in the

last two to three decades aspen on the Ashley NF has increased. It is still far from its historic range but the trend is now upward. The increase in aspen is due primarily from disturbance as a result of harvesting and fires (both natural and prescribed). The upward trend has occurred primarily in the lodgepole pine and ponderosa pine types, with a modest increase in the Engelmann spruce, lodgepole pine, sub-alpine type.

Big game considerations were a major part of analysis considerations for forest management in 1986. However, this analysis has changed due to more emphasis on a broader range of species and with the addition Management Indicator Species (MIS) in the Forest Plan. Also, though threatened and endangered species were important and emphasized in the 1986 Plan there is an even greater focus on these species today and their relationship with forested habitats.

4.3.2.2. Need for Change

The major issues driving forest management on the Ashley NF today are the need to reduce fuels on a landscape scale, the need to restore or maintain watershed health, and the need to restore or protect habitat for threatened and endangered species. The guidance for achieving desired condition for forested vegetation in the 1986 Forest Plan is limited and vague. However, the intent was to change the forested stands from predominately older and mature age classes to younger age classes. This management direction is outdated. A better approach would be to move toward a good representation and distribution of structural age classes over broad landscape areas and, where possible, diversity in species composition. This approach is in line with current national direction that emphasizes removing fuels (e.g., salvage), and improving stand structure to decrease ladder fuels and crown fires (e.g., thinning and timber stand improvement). National direction also emphasizes watershed health and threatened and endangered species protection. The current management of the lodgepole pine type on the Ashley NF, however, is almost opposite this direction.

Watershed standards such as Effective Clearcut Acres (ECA) have played a major role in forested area management, particularly in the lodgepole pine type, for the entire planning period. The ECA model, or standard, is designed to protect watersheds and streams from damage from excessive vegetation removal. It was based on one study in Colorado done approximately 30 years ago. It is a quick and inexpensive way to monitor watershed activities but it has not been validated for the Ashley NF as to how well the estimates work, if they work, or if local modifications/improvements can or should be made.

The ECA model was designed to monitor harvesting activities, including road building. Nothing in the model or in the 1986 Forest Plan standards addresses the possibilities of landscape-sized fires. The ECA model does not address fire as an agent in creating openings or what happens to watersheds with large or even small fires. Therefore, there is a need to review and revise management direction now in relation to the existing watershed threat, even though the ECA is at the 1986 Forest Plan upper limit, rather than trying to do restoration work after a large fire when there is little vegetation to work with.

4.3.3. Range

Desired future condition for Range in the 1986 Forest Plan states that the Forest will maintain a quality range program, managed to optimize the production and use of forage on all suitable range to the extent it is cost effective and in harmony with other resource uses.

The goal for Range in the 1986 Forest Plan is:

- Achieve satisfactory ecological condition on all rangelands. Maintain or obtain plant diversity to meet the requirements of NFMA.

4.3.3.1. Major changes since 1986

The 1986 Plan lists an objective to maintain or improve all range in a “fair” or “better” condition, and measures success and provides direction based on whether rangelands are in a “satisfactory” or “unsatisfactory” condition. The reference to a “fair” or “better” condition was specifically tied to an extensive and formal inventory that was specifically developed to measure the value of rangelands as they pertain to livestock grazing and forage conditions rather than overall ecological health. This direction was tied to measurable parameters. However, this system of inventory in which terms of poor, fair, good were used to define rangeland condition was tied to one particular use (i.e. livestock grazing) and is no longer in use.

An example of how this system is unsuited to a broad range of ecological values is demonstrated by its description of sagebrush communities. Sagebrush under this inventory would receive a low value for forage, which would negatively influence the overall rating for an inventoried area. Therefore, a sagebrush community that received a good or excellent condition rating under the criteria of the 1986 plan would likely have low value for sage-grouse nesting habitat because the evaluation system on which the 1986 plan was based used a narrow range of values as criteria for condition class.

Management of rangelands has also changed since the 1986 Forest Plan. Currently adaptive management has been incorporated as a strategy to ensure the sustainability of rangeland resources and other ecological services. An adaptive management strategy is typically developed by an interdisciplinary team of resource specialists and is a planning and monitoring process that periodically evaluates desired resource conditions and establishes management benchmarks and mitigation measures that maintain desired resource conditions, or moves unsatisfactory resource conditions toward desired conditions. If monitoring indicates that conditions are not being maintained or are not trending towards desired resource conditions, then management adjustments will be made in order to reach desired resource conditions. Adaptive management adjustments may include changes in livestock numbers, season of use, grazing systems, grazing management practices, or allotment improvements.

4.3.3.2. Need for Change

Desired conditions, goals, objectives, and standards and guidelines for rangeland management in the 1986 Plan are vague or not measureable. As described above, the inventory used to evaluate rangelands was primarily concerned with forage value and less

concerned with ecological values at plant community level. Likewise, many of the standards and guidelines are simply direction on how the range program should be administered and not what standards and thresholds should be monitored to measure the ecological health of rangelands and the effects of grazing on these rangelands.

4.3.4. Soil, Water, and Air

Desired Future Condition for Soil, Water, and Air in the 1986 Forest Plan states that the quality of water yield will be consistent with current standards set by law. The water resource improvement and rehabilitation backlog of 1,031 acres will be completed by the year 2000. High mountain reservoirs which are replaced by other storage projects will be stabilized at optimum levels for fisheries and recreation use.

The goals for Soil, Water, and Air in the 1986 Forest Plan are:

- Increase water yields from National Forest watersheds.
- Improve and conserve the basic soil and water resources.
- Manage for the maintenance of Air Quality and Related Values (AQRV).

4.3.4.1. Major changes since 1986

Soil monitoring direction has been updated since the 1986 Forest Plan. The current reference source for updated soil quality monitoring direction is the 1995 Soil Management Handbook, R-4 Supplement 2509.18-95.1. This source document was not in existence when the Forest Plan was prepared in 1986. Also, further direction for maintenance of the soil resource was identified in the High Uintas Wilderness Monitoring Plan amendment of 1997.

The importance of water rights on National Forest lands has had more attention since the 1986 Forest Plan. This has resulted in the Intermountain Region placing a higher priority on securing water rights on the Forest through verification of water use and the purchasing of water rights.

In April 2004 national direction regarding ground-water management was developed by the USDA Forest Service Minerals and Geology Management Program Watershed, Fish, Wildlife, Air, and Rare Plants Program and is outlined in the Draft Ground-Water Resources Inventory and Monitoring Technical Guide.

Since the current 1986 Forest Plan was implemented, air quality has had increased attention as a public and agency concern. Documented increase in nitrates across the Rocky Mountain West has occurred. Also, the Forest Service Manual system has been updated for air quality since the current Plan was implemented.

4.3.4.2. Need for Change

Soil, water, and air components of ecosystems are currently evaluated with other ecological resources. For example, soil productivity is often determined by the type of vegetation growing on a specific soil or the amount of ground cover. Stream bank stability is often evaluated based on the type and diversity of vegetation present within a stream network. The 1986 Forest Plan was set up to address each ecological resource or

program area separately. Therefore, desired conditions, goals, and objectives for soil, water, and air were not incorporated as standards and guidelines when planning for other multiple uses on the Forest. Inventories did not incorporate soil, water, and air goals and objectives as priorities. Therefore, appropriate standards and guidelines and inventories based on the best available science need to be established to guide management activities on the Forest so that a more integrated ecological approach can be taken in Forest planning and management.

The 1986 Forest Plan standards and guidelines for soils need to be revised to reflect updated concepts about soil productivity and appropriate monitoring indicators found in 1995 Soil Management Handbook, R-4 Supplement 2509.18-95.1, and place more emphasis on soil productivity monitoring. This is especially true in alpine areas and areas of high intensity management. The need to establish benchmark soils⁵ exists in those areas of concern. However, the concept needs to change from benchmark soils to include representative soils.

The 1986 Forest Plan also identified the need for a level 3-soil inventory on the Forest. Direction contained in the Terrestrial Ecological Unit Inventory (TEUI) protocols needs to be incorporated into the inventory, and the revised Forest Plan needs to emphasize the need to collect “appropriate” types and levels of soil resource information to monitor long-term productivity as required by NFMA. Revision should also include an updated strategy for completion of TEUI mapping that addresses and prioritizes the following areas: alpine ecosystems, wetlands and riparian, high intensity use areas: ATV’s, timber, grazing, dispersed recreation. Also mapping of the Wyoming portion of the Ashley NF needs to be completed to the appropriate Land Systems Inventory level.

Concerning water resources, the Desired Future Condition expressed in the 1986 Forest Plan is broad in nature. It gives special emphasis to habitat such as riparian zones and aquatic systems. It addresses water quality being consistent with standards, watershed improvement on 1,031 acres, and stabilization of high mountain reservoirs as replaced by other storage projects. It does not reflect the holistic approach to water-dependent ecosystems, nor does it address specific resource conditions or current management direction, laws, regulation, and policy.

Specific examples of information not in the 1986 Forest Plan include:

- Limitations on the development of water for domestic, irrigation, livestock or industrial uses where needed to ensure health of water systems (e.g., surface and below-ground flows, riparian zones, wetlands, stream channel health, etc.)
- Provisions for sustainable ground water systems and consideration of ground water quality.

⁵ Benchmark Soil – A soil that, because of its great extent or unique importance, is important in determining properties and interpretations of the soils over a larger area, or one of critical importance. Information obtained and reported about benchmark soils can be extended to closely related soils (USDA Forest Service, Intermountain Region 1995).

- The link between surface and ground water resources. Focus in the 1986 Plan was on increasing water yield rather than maintaining watershed health for all water-related resources.
- Guidelines on how to handle increase oil and gas development including resource protection measures and best management practices.
- Consideration of all components associated with watershed health (i.e., vegetation across the landscape, role of channels including intermittent and ephemeral channels, floodplains, links between surface and ground water, etc.).
- Municipal water supplies beyond the Vernal Municipal Watershed.
- Direction regarding mandatory bypass flows, water rights, and instream flow coordination efforts.

The 1986 Forest Plan addresses air quality in the overall context of air quality related values, but with an objective limited to land management activities. Because of the many influences on air quality within the Ashley NF, the revised Forest Plan needs address more pro-active strategies in ensuring air quality protection. This includes coordination with other agencies and entities, monitoring, and education.

4.3.5. Riparian

The 1986 Forest Plan did not identify Desired Future Conditions regarding riparian areas. However, the 1986 Forest Plan did identify goals, objectives, and standards and guidelines under the heading of Riparian.

The goal for Riparian in the 1986 Forest Plan is:

- Protect and enhance the unique and valuable characteristics of riparian areas.

4.3.5.1. Major changes since 1986

See section 4.4.4 Soil, Water, and Air

4.3.5.2. Need for Change

See section 4.4.4 Soil, Water, and Air

4.4. Need for Change Summary

The 1986 Forest Plan was developed in an era when specific resources or program areas were the focus of land management. Consequently, the 1986 Forest Plan was designed to address each ecological resource separately. When the Forest Plan was approved in 1986, direction toward ecosystem management was a concept that was just beginning to be accepted as the foundation for understanding and sustaining ecosystem diversity and resilience. Timing prevented the incorporation of ecosystem management into desired future conditions, goals, objectives, standards and guidelines, and inventories into the 1986 Forest Plan. The revised Forest Plan for the Ashley NF, therefore, needs to refocus single resource planning, desired conditions, goals, and objectives into an integrated Forest Plan using an ecological approach to ecosystem planning and management.

Desired conditions need to be more integrated and measurable. Goals, objectives, guidelines, and strategies need to reflect new laws, regulations, and the best available

science. Monitoring protocols need to be revised to incorporate the latest methodologies and metrics, and should be designed to be adaptive and flexible in order to incorporate evolving ideas, new data, and current monitoring strategies.

5. Social Conditions and Trends

5.1. *Beliefs and Values about Forest Resources*

The Forest Service has an obligation to preserve opportunities, services, and choices for future generations. In this way the Ashley NF can contribute to the well-being of visitors and communities over the long-term. As part of assessing social sustainability, an independent consultant (Adams-Russell Consulting) collected information on values and beliefs about the Ashley NF, which identifies local perspectives regarding Forest resources and management. The results from this assessment were presented in the document *Aspects of Beliefs and Values Regarding Resources and Management of the Ashley National Forest* and provide a different type of information than either survey or socioeconomic data. The executive summary from the report summarizing the findings is included below. A discussion of existing conditions and trends begins after this summary with *Recreation Programs and Facilities*.

The Institution of the Forest Service and the Ashley NF

Findings regarding beliefs and values about the Forest Service as an institution and specifically about the Ashley NF have overlapping content. Beliefs about the agency as an institution suggest the agency's capacity to fulfill its mission is affected by limited budgets, limited personnel resources, and changing personnel expertise. The apparent loss of expertise combined with a perceived limited presence of "boots on the ground" in the forest suggests to participants that the agency may not have sufficient knowledge of effectively management resources. Additionally, turnover in key leadership positions affects the continuity of management and the working relationship with adjacent communities and interested parties. Participants also suggest the mission of the agency has become muddled and unclear to community observers. Participants describe an agency in which its manager's "hands are tied" by litigation and therefore reluctant to make decisions. Participants also express concern about the overall level of law enforcement resources within the agency at a time when problem behavior about users is increasing.

Specific beliefs about management of the Ashley NF make a general observation that working relationships with Forest managers are constructive. However, there is specific concern about the responsiveness of the Ashley NF to citizens and local government, communication styles that are not customer friendly, and a desire for more District based decision making and management authority. Participants also express positive evaluations of the efforts to engage partners and Cooperating Agencies, but frustration with the content of those relationships and the outcome of the working relationship.

Both sets of beliefs suggest a perception of the agency as compromised by budgets, personnel resources, and knowledge of local conditions at a time when demands for use are increasing and Forest conditions and facilities are deteriorating.

Forest Characteristics and Existing Conditions

The Ashley NF is described as a “local forest” that is highly valued and extensively used by residents of adjacent communities. Historically, grazing, mining, and timber harvesting have been traditional activities on the Forest. However, today most participants suggest the primary use of the Forest is for recreation purposes. Accessibility and the size of the Forest offer opportunities for recreation opportunities that disperse users into low country and high country areas.

There is some notable variability in assessments of Forest conditions. Some participants suggest the forest is in poor health, primarily because of bark beetle infestations that are aesthetically unpleasant and pose a significant fire danger. Additionally, the dense stands of timber and undergrowth are evaluated as posing significant threats to watershed health, especially the availability of water for agricultural and culinary purposes. Other participants suggest the forest is healthy and without major compromise other than an increase in the volume of visitors, a decline in the maintenance of facilities such as campgrounds, trails, and roads, and growing damage from off-road vehicle use.

Beliefs and Values: Forest Resources

This information was grouped into three categories: recreation and aesthetic values, other natural resources, and special designations. The most prominent use and amenity resources identified by participants include aesthetics, dispersed camping, the opportunity for experiencing the human connections with the natural world, open space, quiet and solitude, and recreation. The most prominent ecosystem components in the data are oil and gas resources, vegetations resource for grazing and timber, water, and wildlife.

Participants identified three broad categories of existing or proposed special designations that are valued or controversial: The High Uintas Wilderness Area, The Flaming Gorge National Recreation Area, and the High Uinta-Flaming Gorge Scenic Byway. Although all of these resources are valued, there was near unanimous agreement that water is the most significant resource associated with the Ashley NF. Participants emphasize that water is the “life blood” of the region. The quality and amount of water will determine the current and future health of the forest and impact those who use and depend on those resources.

Management Issues and Concerns

Participant statements about management concerns or desired changes in current management direction were grouped into categories that somewhat overlap with the discussion of Forest resources. These categories are access and recreation; ethics, education and enforcement; Forest conditions and resources, special designations, and Ashley NF approaches to management and implementation.

Access and recreation topics include a strong emphasis on providing access and addressing road closures, maintaining and expanding opportunities for dispersed camping, addressing the opportunities for off-road recreation, addressing the damage and disturbance to other visitors of off-road recreation, developing opportunities for quiet recreation, and addressing trail and road maintenance and the communication about and effects of road closures.

Concerns about ethics, education, and enforcement are directly related to perceptions about the presence of litter, vandalism of facilities, and problem behavior among some Forest users. These conditions are attributed to a change in land ethics that participants suggest can be remedied by a combination of education and enforcement efforts.

Management concerns about Ashley NF resources and conditions include recognition of the benefits and costs of current grazing practices, protection and cultivation of historic and archaeological resources, the economic benefits and environmental costs and benefits of oil and gas development, the interaction of fire suppression, beetle kill, and timber conditions, the role of timber harvesting in addressing forest health, the importance of water and watershed conservation to agricultural and other users, and effective management of wildlife habitat.

Special designation concerns are grouped into three categories: the Flaming Gorge National Recreation Area, wild and scenic rivers, and wilderness and roadless areas. The primary topics of concern about management of the NRA concern the benefits of energy development versus its influences on user experiences and Forest conditions, the importance of considering the economic costs and benefits of the NRA to adjacent communities, the use of fees collected, the appropriateness of fee collection, the effects on the quality of user experiences and local businesses of the volume of summer use on the Green River, and the economic and social costs of proposed water diversion from interests in Colorado. Participant statements about wilderness show consistency about the value of existing wilderness and polarization about adding additional wilderness. Opponents suggest that wilderness and other special designations limit management options and “lock up” the resource for use by an “elite” few. Proponents of additional wilderness and roadless areas suggest that these are limited resources that provide heritage as well as ecological and wildlife benefits. Preservation of these types of lands is valued because they are reserves of natural processes that are usually not observable outside such designated areas.

Forest Service Management Approaches

Although there is a generally positive evaluation of Ashley NF managers and their decision making, there is also a desire for improvement and change in specific areas. Participant statements cluster into concerns about community relationships and customer service, a desire for more attention to economic development and the effects of decision making on rural economies, the costs and benefits of multiple-use as a management strategy for the future, a desire for attention to the effectiveness of planning, document preparation, and what can be accomplished within existing budget and personnel constraints. Participants also emphasized the importance of facilitating the use of

volunteers as a means to address some of the existing maintenance issues on the Ashley NF. The final thought that is common to many of the other elements is a desire for sincere and authentic interaction with interested publics and transparency in the planning, decision-making, and implementation process.

Tribal Issues and Concerns

Contacts were made with the Ute Tribe Government. Discussions with some department personnel suggest there are solid working relationships around natural resources management and fire response issues, but a need for improvement in addressing concerns about cultural uses of the Ashley NF by tribal members. Discussion suggest that tribal members use Ashley NF lands for gathering of traditional plants and other vegetation, visiting sacred sites, and other uses related to cultural traditions. Participants emphasize there is an undeveloped opportunity by the Ashley NF to include in its heritage programs Native American history and traditions that are part of the history of this region. Discussions also suggest a strong desire for additional work by the tribe with Ashley NF managers on the process of Forest Plan revision.

Public Involvement

Participants describe diverse desires for public involvement that range from traditional open houses and public meetings to other approaches such as using local venues and organizational meetings. Participants also expressed a strong need for an authentic process that considers public desires as an integral part of the decision-making process. Participants suggest that such processes should address the social, economic, and cultural diversity of adjacent communities, including important differences among the states and adjacent counties.

5.2. Recreation Programs and Facilities

The Forest Service organizes its recreation management into programs. Each program covers multiple activities and settings. Some overlap with other programs for recreation or other resources. Managing by programs and within a recreation niche areas helps ensure that a range of recreation opportunities are provided. It also gives managers a way to track where recreation budgets are spent and what has been accomplished in each program area.

5.2.1. Developed Recreation

Developed recreation takes place at facilities constructed for specific activities or groups of activities. Developed sites offer visitors a sense of security and structure as well as facilities such as toilets, parking, tables, and cooking areas. The developed sites, with the exception of boat camps, are all accessed by roads. Minimally to highly developed facilities are available, depending on the setting and use.

Developed recreation is measured in terms of the PAOT (People At One Time) days of developed facility capacity available during the recreation seasons for the facility. Developed recreation programs are managed by ranger districts. The largest and most

complex program on the Ashley NF is on the Flaming Gorge Ranger District, mostly within the Flaming Gorge National Recreation Area (FGNRA). Additional opportunities associated with developed recreation, such as resorts and marinas, are managed through the recreation special use program.

Table 5-1. Developed sties and use on the Ashley NF

Facility Type	Sites	PAOTs
Campgrounds	58	8,127
Rental Yurts & Cabins	6	
Boat Ramps	17	3,068
Day use (trailheads, overlooks, amphitheaters, fishing access sites, beaches, picnic areas, interpretive sites, other)	64	3,842
USFS Visitor Information Service Sites	4	

5.2.2. Recreation Special Uses

The Forest facilitates some of its recreation program through the Recreation Special Use program. This program helps the Forest to provide recreation opportunities that would be otherwise unavailable on National Forest Lands. The campground concessions, resorts, and marinas contribute to the developed recreation program, while outfitter-guide permits mostly contribute to the dispersed recreation program.

Table 5-2. Special use permits on the Ashley NF

FY 2006 Recreation Special Uses	Number of Permits
Campground Concessions	2
Marinas	3
Resorts	6
Outfitter-Guides	64
Recreation Events	85
Recreation Residences	59

5.2.3. Travel Routes

Roads and trails provide opportunities for dispersed recreational travel activities, such as scenic driving, riding ATVs, horseback riding, mountain biking, cross-country skiing, and hiking. They also provide access to developed sites and areas for other dispersed activities. Trails are managed through the recreation program. Roads are commonly used to access other types of resource uses and management, and are usually managed through the engineering program. Travel management on both types of routes is generally coordinated among resource specialties.

Table 5-3. Miles of travel routes on the Ashley NF.

Type of Route	Miles
Highway	73
Open Road for street legal vehicles only	297
Open Road allowing mixed traffic	988

Undesignated Routes in Travel Designation Area	386
Motorized Trails	139
Non-Motorized Trails (non-wilderness)	316
Wilderness Trails	450
Administratively Closed Forest Roads	90
Total	2,739

5.2.4. Dispersed Recreation

Dispersed recreation on the Forest includes travel or access via roads and trails, and water-based access along the Flaming Gorge, other reservoirs, and the Green River. Camping, fishing, and travel on trails or roads are among the most popular dispersed recreation activities. Outfitted opportunities include boating, rafting, fishing, hunting, and wilderness trips with stock or on foot.

Dispersed recreation areas are mapped as 1,098,108 acres⁶ of general Forest areas and 110 concentrated use areas covering 904 acres. General Forest is the Forest, outside the developed sites, wilderness, and concentrated use areas. Concentrated use areas are areas where few facilities are provided, and people gather and/or camp with high frequency and/or in larger groups. These use categories include lands mapped in all ROS categories (USDA Forest Service 2006b).

5.2.5. Interpretive Services

Visitor information is provided at ranger district offices in Green River, Wyoming, and in Manila, Dutch John, Vernal, Duchesne, and Roosevelt, Utah. Seasonal visitor services are offered at Red Canyon, Flaming Gorge Dam, and Rock Creek Visitor Centers. Additional interpretive facilities include signs at roadside pullouts, trailheads, historic sites, and other features.

5.2.6. Special Designations and Features

- Flaming Gorge National Recreation Area
- High Uintas Wilderness
- Sheep Canyon Geologic Area
- Research Natural Areas
- Dinosaur Diamond Scenic Byway includes the segment of U.S. Highway 191 between Duchesne and Helper, Utah. The segment is the same as the Indian Canyon Scenic Byway, and crosses the South Unit of the Forest. As the Dinosaur Diamond Scenic Byway, it is managed to promote tourism along its route through Colorado and Utah.
- Indian Canyon Scenic Byway includes the segment of U.S. Highway 191 between Duchesne and Helper, Utah where it crosses the Forest. The segment is the same

⁶ The dispersed recreation program includes heavy and concentrated use on Flaming Gorge Reservoir and within the Green River corridor. These areas can only be reached by watercraft. Since it is currently unclear how to account for water-based concentrated use areas, and direction is pending, they are not included in the acres shown above.

- as the Dinosaur Diamond Scenic Byway, and follows Indian Creek through the Forest to the 9,100 foot summit on the Forest's southern boundary.
- Flaming Gorge - Uintas National Scenic Byway is also known as The Drive through the Ages. The byway includes U.S. Highway 191 from Vernal to Dutch John, Utah, and Utah Highway 44 from U.S. Highway 191 to Manila. This drive along the eastern edge of the Uinta Mountains and the southern rim of Flaming Gorge Reservoir affords outstanding views of the river gorge and the High Uintas. Interpretive pullouts provide roadside geology, ecology, and history lessons.
 - Sheep Creek – Spirit Lake Scenic Backway - The backway includes a 13 mile loop of Forest Road 218 around the Sheep Creek Geologic Area from Utah Highway 44, and a 17 mile spur from FR 218 along Forest Road 221 to Spirit Lake. The road provides access to and a drive through the unique geological features of Sheep Creek and the visually dramatic Uinta Fault. The Backway is also managed as a recreation access road to dispersed areas, Spirit Lake, and the High Uintas Wilderness, and as access for other resource management activities.
 - Red Cloud-Dry Fork Loop Scenic Backway extends 45 miles in a loop with U.S. Highway 191 north of Vernal Utah to the Forest Boundary in Dry Fork northwest of Vernal. The road provides access to and a route through the eastern Uinta Mountains for full size vehicles and mountain bikes. Interpretive sites, overlooks, dispersed use areas, lakes, ATV trails, and hiking trails are additional opportunities off of the Backway.
 - Reservation Ridge Scenic Backway connects U.S. Highways 191 and 6 along Reservation Ridge and Right Fork White River on the Ashley and Uinta-Wasatch-Cache National Forests. Forest Road 147, along the ridge, offers un-crowded driving with views in all directions. Road 181 follows the river through the Uinta-Wasatch-Cache National Forest.
 - Little Hole National Recreation Trail, Forest Trail 006, follows the Green River through the Forest from the Flaming Gorge Dam through Red Canyon to Little Hole Day Use Area. The seven mile trail is open to hiking and mountain biking, and provides access to the Green River for fly-fishing
 - Fish Creek National Recreation Trail follows a ridgeline above Fish Creek between Moon Lake and Center Park Trailhead in the southern Uinta Mountains. The six mile trail is managed for horse and foot travel under a minimal maintenance schedule.
 - Jedediah Smith Trappers Route 1824, Utah – Managed by the USDI Park Service, the Forest part of this route follows the Green River and the Flaming Gorge Reservoir (Public Lands.org).
 - Swett Ranch Historic Site – The historic ranch is managed as an interpretive site on the Flaming Gorge NRA. The ranch was home to the large Swett family, who ran the ranch in the early and mid-1900s.
 - Ute Tower Historic Site is a fire lookout tower constructed between 1933 and 1935. Though no longer serving as a lookout tower, the structure remains, and gives people the opportunity to see what living and working in the tower was like for early lookouts.
 - Carter Military Road led to developments and growth of communities in the Uinta Basin and Mountains. Completed in 1881, the road was built without surveys by

Fort Bridger's Judge Carter as a supply route between military forts. The road is listed in the National Register of Historic Places.

- Whiterocks Cave contains impressive formations of water deposited calcium. Guided tours are offered in September to a few visitors. Access to the cave is difficult. The area is otherwise closed to public access due to safety and vandalism concerns.

5.3. Recreation Visitors, Activities, and Trends

5.3.1. National Visitor Use Monitoring

The Forest conducted its first National Visitor Use Monitoring (NVUM) from October 2000 through September 2001. The results were compiled as National Visitor Use Monitoring Results (USDA Forest Service 2008b). Some of the report information is presented below.

A National Forest visit is defined by NVUM as the entry of one person upon a National Forest to participate in recreation activities for an unspecified period of time. A National Forest visit can be composed of multiple site visits. A site visit is defined as the entry of one person onto a National Forest site or area to participate in recreation activities for an unspecified period of time.

Based on the 2001 NVUM report, for fiscal year 2001 recreation use on the Forest at the 80 percent confidence level were 1.42 million National Forest visits plus or minus 13 percent. There were 1.58 million site visits, an average of 1.1 site visits per National Forest visit. Included in the site visit estimate are 11,778 Wilderness visits.

5.3.2. Forest Visitors

A profile of Ashley NF visitors was developed based upon those visitors interviewed during NVUM. According to the surveys, 74.4 percent of visitors to the Forest are male and 25.6 percent are female (Figure 5-1).

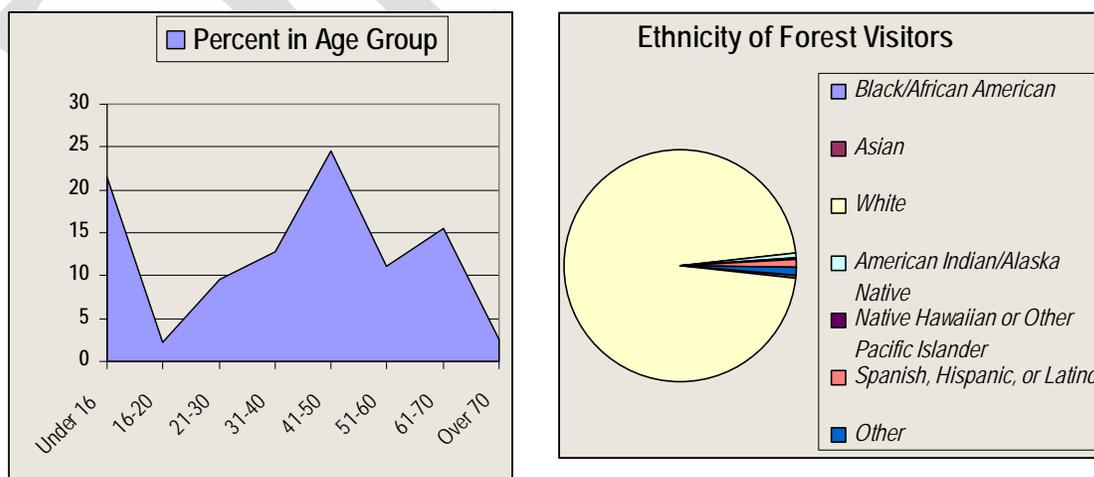


Figure 5-1. Age group and ethnicity of visitors to the Ashley NF.

Visitor travel distance to the Forest was also recorded during NVUM interviews. Seventy-five percent of visitors interviewed came from counties in Utah, Wyoming, and Colorado that are within 214 miles of the Forest.⁷ Twenty-five percent of the visitors traveled from 220 to 2,800 miles to get to the Forest. The interviewed visitors in total reported living in 44 different states, and a few visitors came from other countries.

5.3.3. Recreation Activities of Ashley National Forest Visitors

The most common recreation activities reported in the NVUM surveys include viewing scenery, wildlife, and natural or historic features. Over one-third of visitors stayed overnight on the Forest, whether at developed campgrounds, in cabins and resorts, or at dispersed sites along the road and in the back country. The overnight stays, one-day gatherings with family and friends, and general relaxing, emphasize the popularity of developed areas and travel routes on the Forest. Many of these activities also take place in dispersed areas, most commonly along roads. Fishing is also among the most popular activities on the Forest.

Those visitors who were interviewed on the Forest during NVUM were asked to identify, from a pre-determined list, the activities they participated in while visiting the Forest. The results from the survey are charted below. Note that most respondents said they participated in multiple activities, which is why the results total greater than 100 percent of the visitors participating.

⁷ Not an exact percentage split between counties that include Ashley NF lands and those slightly more distant.

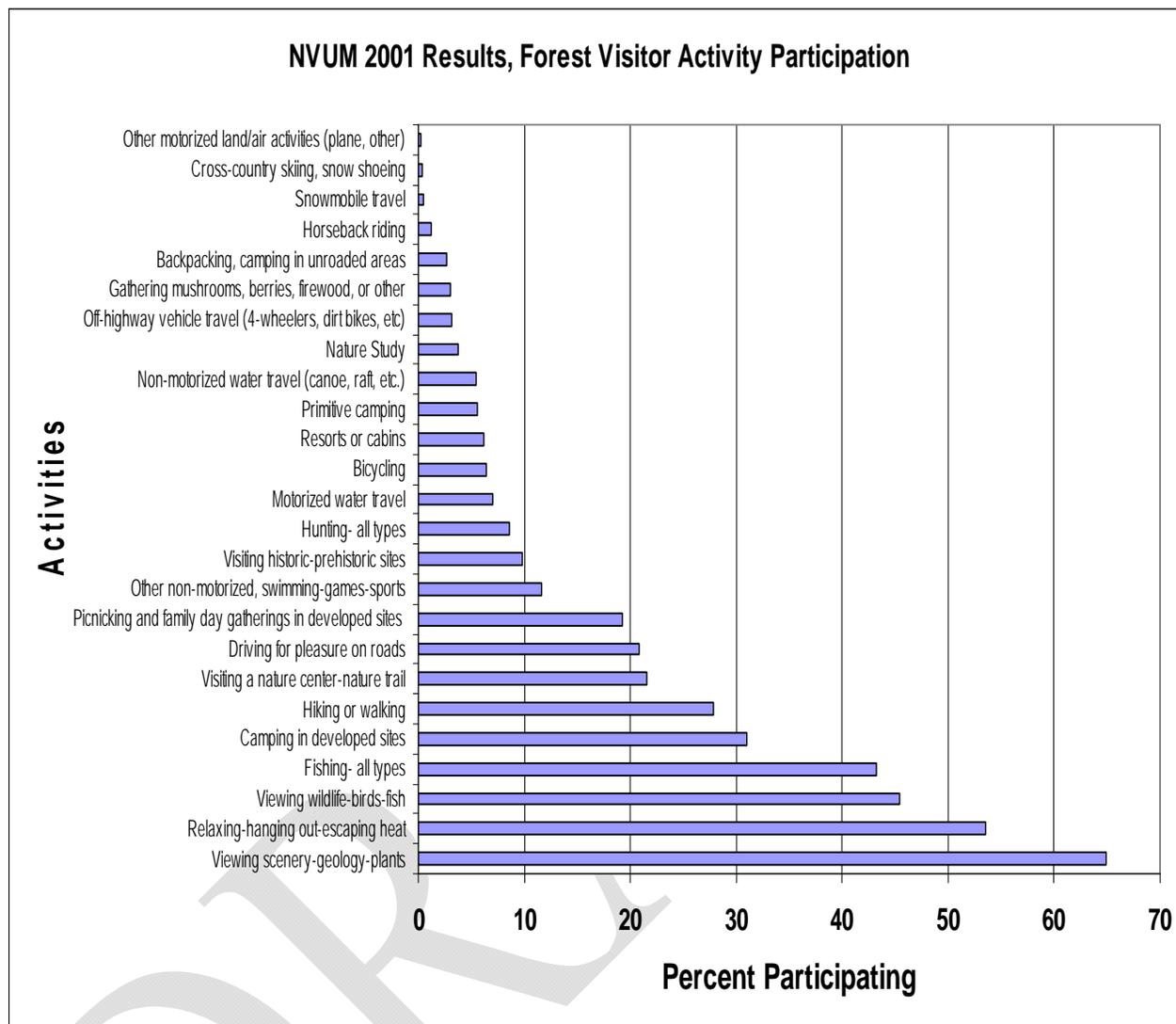


Figure 5-2. NVUM 2001 results for visitor activity participation.

NOTE: The age of the data, changes in recreation choices since 2001, and observations by Forest personnel indicate more trail uses than were reported in the NVUM results. Recent Utah recreation data indicates participation in OHV and motorcycle use on all public lands at a much higher rate than NVUM data indicates. Wilderness visits are also likely underestimated (26.3% error rate in data) because many visitors to the High Uintas Wilderness access the area from the Wasatch Cache National Forest. In fact, the Wasatch-Cache 2004 NVUM Report records more than 162,000 wilderness visits, including visits to two other wilderness areas and a similar data error rate. It is likely that many of these visitors actually spent time on the Ashley NF but were not counted because only exit interviews on the Ashley NF were used for the Ashley report.

5.3.4. Recreation Activities on Public Lands in Utah

Utah State University completed a survey, Public Lands and Utah Communities, in 2007 (PLUC). The survey responses include participation in specific recreational activities on public lands within the last year. The results shown below are the grouped responses from the three Uintah Basin counties that have a majority of Ashley NF lands in Utah. The survey addressed all general types of land use on all public lands, and the results

show similar activities to those reported from NVUM surveys. Though the data is not identical to that of NVUM, the survey responses are useful for addressing participation in outdoor recreation and preferred activities of nearby residents.

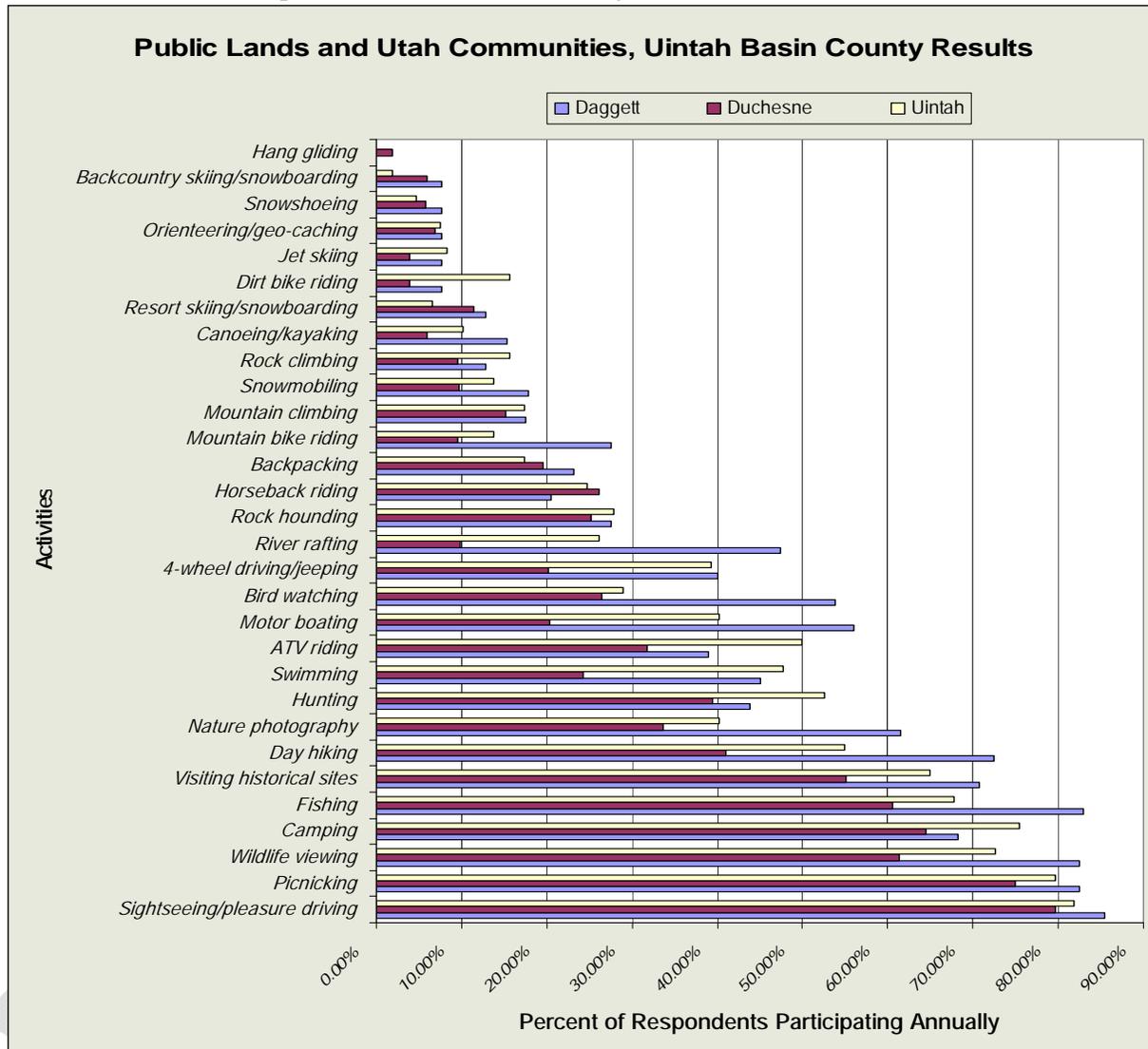


Figure 5-3. PLUC 2007 results for visitor activity participation.

5.3.5. Activity Preference Findings from NVUM and PLUC

Even though these two surveys were conducted with a different purpose, audience, and survey questions, they do validate each other on several points (Similar data not available for Wyoming).

- People participate in a broad range of activities on the Ashley NF and on other public lands in Utah.
- Nearby residents are dependent upon the Ashley NF for at least some of their leisure time individual and group activities.
- The majority of the respondents said that pleasure driving, and viewing scenery, wildlife, and other natural and historic features were a part of their activities.

- Camping, fishing, and gathering with family or friends for picnics or to escape their normal routine were also among the top reported activities.

The variables of the two surveys are compared in the table below. It shows the frameworks that account for differences in survey outcomes.

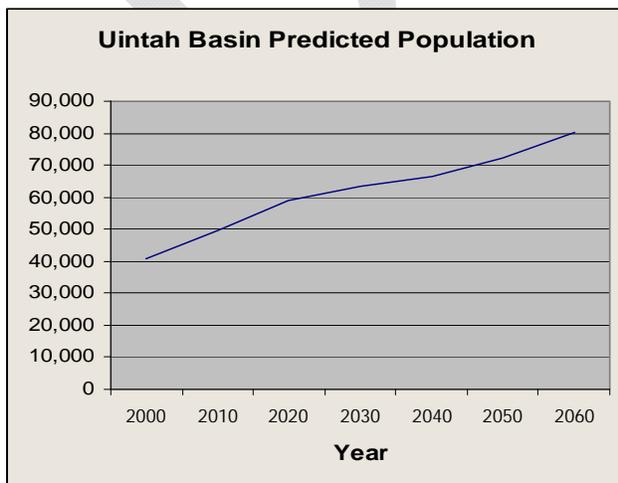
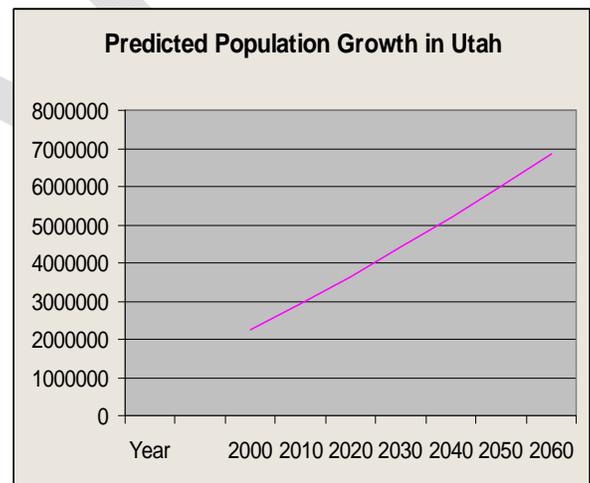
Table 5-4. Comparison of use surveys

>Survey Variable	Purpose	Spatial Limit	Sample Population	Timeframe	Survey Method
National Visitor Use Monitoring	Monitor recreation use & visitor satisfaction on the Ashley N.F. & N.F. System Lands nationally	Ashley National Forest	Ashley National Forest Visitors	October 1999 through Sept. 2000	Exit Interviews for the visit
Utah Public Lands Survey	Collect information on all public land uses and public perception of public land uses in Utah	Public Lands in Utah	Utah resident sample by county	2007, Activities within the last year	Questionnaires by mail

5.3.6. Population and Trends in Recreation

Known and predictable trends at local, regional, and national scales are likely to affect Forest visitation and visitor choices in nature-based recreation activities in the future. These trends are summarized below.

1. About 75 percent of Utah's more than 2.5 million people live within four counties along the Wasatch Front. The current population growth in Utah is expected to continue, and to double by 2035. This information is important because NVUM reports indicate that 75 percent of visitors to the Ashley NF come within 214 miles of the Forest, and this distance zone includes most of the land in the Wasatch Front counties. According to the U.S. Census Bureau, the total U.S. population will increase by slightly less than 1 percent each year. The trend toward an "older" population on the average is expected to continue.



Data Source for Graphs: *Utah Governor's Office of Planning and Budget, 2008 Baseline Projections.* Uintah Basin predictions are of people residing in Daggett, Duchesne, and Uintah Counties, Utah, where substantial growth is predicted. The data do not reflect transient populations related to the recent local boom in oil and gas employment. No, or much smaller population increases are predicted for Uinta and Sweetwater Counties, Wyoming, and for the State of Wyoming for the same timeframe.

2. Research presented from the University of Illinois in *Evidence for a Fundamental and Pervasive Shift Away From Nature-Based Recreation* by Oliver Pergams and Patricia Zaradic (2008) indicates a steady decline in per capita outdoor recreation participation in the U.S. and other countries. For example, visits to U.S. National Parks peaked in 1987, and as of 2006 had dropped by 23 percent. Other data, such as issuance of hunting and fishing licenses and state data (including Utah) show participation declines of 18 to 25 percent in a similar timeframe. Japan has had similar decreases in outdoor recreation during this period. National Forest and BLM visitation data contains time gaps, and earlier information is difficult to compare with more recently developed NVUM data for Forests. Though the researchers used the available data for these lands, the results were inconclusive. Nevertheless, it seems reasonable to assume the trend of per capita National Forest recreation visits would be similar to trends cited above, and would continue at a similar rate over the next several years (i.e., 1 to 1.5% per year).
3. Trends in recreation visits nationally include shorter trips of one to five days, and an increasing percentage of one-day visits. Most visitors indicate at least some time spent in nature appreciation activities (e.g., viewing scenery, wildlife, nature study) and walking. In fact, bird watching was the most rapidly growing activity nation-wide between 1981 and 2001 as reported by Cordell, Betz, and Green in *Recreation and the Environment as Cultural Dimensions in Contemporary American Society*. Rapid increases in motorized activities on roads and trails over the last 10 years are locally evident in Utah surveys (*Public Lands and Utah Communities*, preliminary Uintah Basin reports, Utah State University, Nov. 2007), and confirmed in the field through observations by Forest personnel of activities in both the Wyoming and Utah areas of the Forest.
4. The number of people camping has continued to increase since the 1960's. Since then, the percentage of people who camp with self-contained recreational vehicles has increased, while tent and open-air camping has decreased. Camping trailers and motorized vehicles, including boats, have ever increasing amenities, and the average size of recreational vehicles being purchased appears to be increasing. This suggests a general trend away from more primitive recreation activities (National Survey on Recreation and the Environment, 2000 Report, USDA Forest Service Southern Research Station)
5. Results of *Public Lands and Utah Communities Survey* (2007) by Utah State University show in responses to resource use questions that residents of local counties value recreation opportunities on public lands. The majority of these people would like to see the present mix of opportunities retained. Many survey participants would like to see trail opportunities for motorized vehicle travel increase; others would like to see more areas and trails available for mountain biking and other non-motorized activities.
6. The *Outdoor Recreation Participation Study for 2005* from The Outdoor Industries Foundation (OIF) shows short term (1999 through 2005) trends in

participation similar to trends observed on the Ashley NF, the state of Utah, and the Nation.

5.4. Scenic Resources

The scenery of the Ashley NF is among the amenities contributing to lifestyles and tourism in southwestern Wyoming and Northeastern Utah. The lands of the Ashley NF provide a scenic backdrop for daily life experiences such as travel, work, and play for area residents. The Forest scenery contributes to casual and inexpensive recreation experiences near home, and contributes to a general sense of well-being, security, and constancy. Many people point to their tie to the landscape, regardless of administration or ownership, as a positive part of living in the area. Beyond the local level, the scenery has been a deciding factor in creating several of the Forest's national designations, and is a draw for tourists. Moreover, the general scenic condition influences many people's opinions about ecosystem health and forest management.

People view the Ashley NF from places within the Forest, and from roads, homes, and other areas off of the Forest. The assessment for scenic resources area includes all lands of the Forest, as well as places with views to the Forest.⁸

The Forest Service is required to “inventory, evaluate, manage, and, where necessary, restore scenery as a fully integrated part of the ecosystems of National Forest System lands through the land and resource management and planning process. Scenery must be treated equally with other resources.” Forest Service Manual (FSM) 2380.31 specifies the use of the basic concepts, elements, principles, and variables defined in Ag HB 701, *Landscape Aesthetics, A Handbook for Scenery Management*.

The handbook used to manage scenic resources has changed since 1986. For consistency in this document the terminology of the Visual Management System used for the 1986 Forest Plan has been replaced with Scenery Management System terminology. Following a crosswalk in Ag HB 701, the objectives were converted so that they could be compared to existing condition maps for any Forest Plan revision proposal. The conversions are as follows:

Visual Quality Objective (VQO)		Scenic Integrity Objective (SIO)
Preservation	⇒	Very High
Retention	⇒	High
Partial Retention	⇒	Moderate
Modification	⇒	Low
Maximum Modification	⇒	Very Low

⁸ For analysis, views are limited to those within 15 miles of the area viewed.

Table 5-5. Scenic integrity definitions:

Very High	The characteristic landscape is intact, with only minute deviations
High	The characteristic landscape appears intact. Deviations may be present, but must repeat form, line, color, texture, and pattern common to the landscape character so completely and at such a scale that they are not evident.
Moderate	The landscape appears slightly altered. Noticeable deviations are visually subordinate to the character.
Low	The landscape appears moderately altered. Deviations may be dominant, but are shaped to borrow from the natural landform and other visual dominance elements (line, form, texture, color), and are subordinate to the characteristic landscape when viewed as background.
Very Low	Deviations are dominant, but borrow from the natural terrain and other elements common to the characteristic landscape.

The 1986 Forest Plan standards specify scenic integrity objectives (SIOs) by management area. In many management areas the objectives refer to inventory and other resource priorities. The direction is flexible, yet clearly discusses the need to consider effects to the scenery in project design. The existing inventoried objectives shown on the map below generally reflect direction from the plan.

Scenic Integrity is a measure of the degree to which the landscape is perceived as whole, complete, or intact. The levels of scenic integrity provide a relative measure of deviation from the characteristic landscape within an area. Existing Scenic Integrity maps show a benchmark condition from which to plan for future scenic resource management.

The results of the mapping that show Forest land with low or very low scenic integrity are generally the result of timber production (clear-cuts) and other traditional uses. Scenic integrity is high and very high on 88 percent of the Forest, moderate on 3 percent, and low to very low on the remaining 9 percent of the Forest.

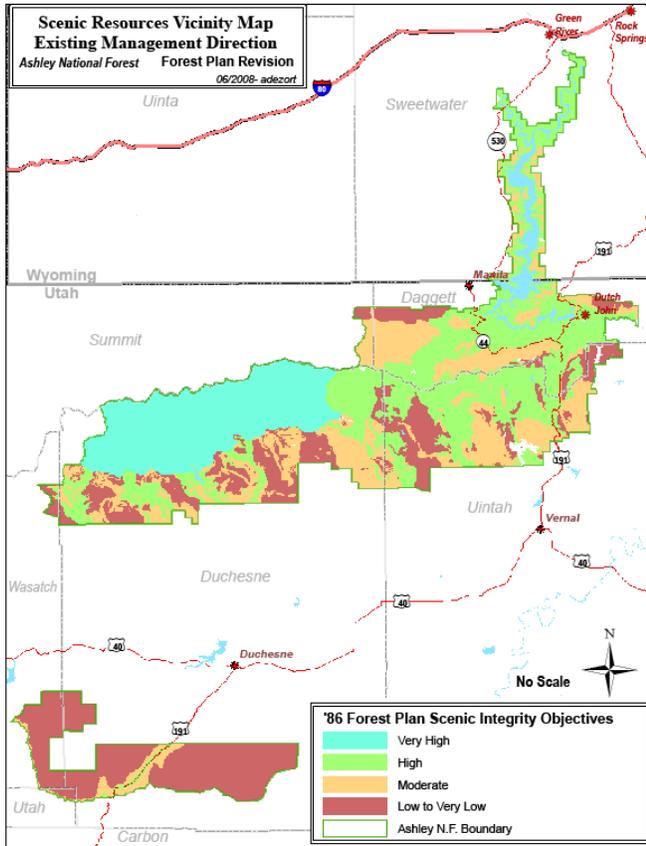
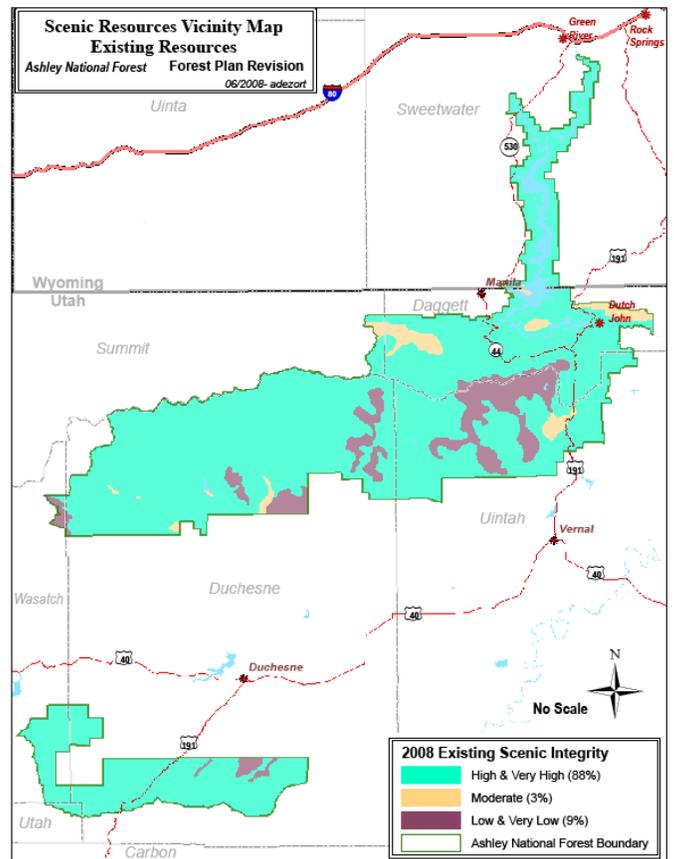


Figure 5-4. The vicinity map shows Scenic Integrity Objectives consistent with the 1986 Forest Plan. In some management areas the direction to meet Scenic Integrity Objectives is included as standards. In other areas it is stated as a value to be considered but should be reduced as needed to meet wildlife or other management area priorities and emphases. Areas with an objective of visual rehabilitation were not mapped and are not shown.

Figure 5-5. Existing Scenic Integrity Levels of High, Moderate, and Low were mapped in 2008. They show a condition of the land regardless of where the area is viewed from. This inventory is accurate only for large scale planning, and was not developed to reflect every visually evident deviation on the Forest.



5.5. Heritage Resources

The mountains and river valleys of the Ashley NF are replete with the remnants of past cultures that once hunted, farmed, raised families, and sought shelter from the elements. The evidence of their lives and activities remind us of the thousands of generations that precede us. These heritage resources hold clues to past ecosystems, add understanding to our landscapes, and provide links to the present. These fragments of our heritage and products of our diverse culture are referred to by federal agencies as “cultural resources,” “historic properties,” or “heritage resources.” The Forest Service has chosen to refer to this resource as “heritage,” to reflect the findings and policies of Congress.

Under policy established by Congress, all federal agencies are required to act as responsible stewards of the heritage resources under their jurisdiction. The Forest Service is responsible for carrying out this policy on lands that contain many of the Nation’s important heritage resources, and charged to manage them in a spirit of stewardship for the enjoyment of present and future generations. If these resources are degraded or lost, the value of National Forest System is diminished and their public value is forever reduced.

The importance of the history associated with the lands of the Ashley NF has been long recognized. William Ashley and early trappers, John Wesley Powell’s expeditions, early homesteading, scattered mining, Civilian Conservation Corps and even some outlaws all crossed the Ashley. However, the importance of the material remains or the cultural resources, especially prehistoric remains, on the Forest has been slower to gain appreciation. Until the 1986 Forest Plan was approved, little energy or funding was expended to actively manage these resources.

Existing Conditions and Trends

The Ashley NF contains some of the most important historical and prehistoric sites and landscapes in northern Utah and Southwest Wyoming. These resources span at least 10,000 years of human occupation and use of the lands in and adjacent to the Ashley NF. By 1984 1.2% of the Ashley NF had been surveyed for cultural resources. This included 440 cultural resources inventories covering 16,660 acres. By December 1, 2004, 15% of the Forest had been surveyed, which included 826 projects covering about 224,049 acres. In 1984 the Forest had documented 345 cultural resource sites. By December of 2004, a total of 1,630 heritage resource sites have been documented on the Forest. Many of these sites are eligible for the National Register of Historic Places, but only five have been listed on the Register. These are Swett Ranch, Ute Fire Tower, Carter Military Road, Stockmore Guard Station, and Indian Canyon Guard Station.

In 1984, 79 (23%) known sites were historic and 266 (77%) prehistoric. As of December 1, 2004, the 1,630 sites recorded on the Ashley are 224 (14%) historic and 1,447 (90%) prehistoric.⁹ There has been a significant increase in the number of prehistoric sites recorded since 1984.

⁹ Percentage does not equal 100% because 68 sites are multi-component with both historic and prehistoric elements.

In 1984, 13 sites (4%) were listed or considered eligible for the National Register. At that time 163 sites (47%) were determined to be ineligible and 169 sites (49%) were had not been evaluated. In 2004, 654 sites (41%) sites were listed or eligible for the National Register. Another 743 sites (46%) are not eligible for the register with 205 sites (13%) that had not been evaluated. The percentage of non-eligible sites has remained very steady, but a significant change has occurred in the ratio of unevaluated and eligible sites since the 1986 Forest Plan. This is a result of a concentrated effort to evaluate all cultural resources at the time they are recorded.

All of the projects listed in 1984 were related to Section 106 compliance activities. Between 1991 and 2004 the Forest has conducted 58 non-compliance survey projects. In addition to the thousands of acres that would otherwise not be surveyed, 773 sites were recorded during these projects. That is double the number of sites that were known in 1984 and 60% of the total sites recorded since 1984 (1,285).

5.6. Lands

The Ashley NF encompasses approximately 1,382,347 acres of National Forest land within the States of Utah and Wyoming. This includes 258,156 acres in Daggett County, 698,241 acres in Duchesne County, 268,864 acres in Uintah County, 3,797 acres in Utah County, 12,644 acres in Summit County, 44,422 acres in Wasatch County, and 96,223 acres in Sweetwater County in Wyoming.

Land management within the Ashley NF includes all aspects of real estate administration conducted by the Forest Service including, landownership adjustment and control through land exchange, purchase, donation or disposal, right-of-way corridor planning, acquisition of rights-of-way and easements, occupancy trespass abatement, surveying and posting Forest boundary lines, special use permit processing and administration, communication site planning and management, and withdrawal review. The goal of these various real estate management activities is to better serve the public, protect natural resources, and ensure more effective forest management.

Existing Conditions and Trends

Landownership Adjustment and Control: Since implementation of the 1986 Forest Plan, the Ashley NF has entertained several land exchange proposals from private landowners; only one of which resulted in an exchange. In 1990, the Ashley NF received administrative jurisdiction of approximately 315 acres of federal land called the Lower Stillwater Area from the Department of the Interior. This land was acquired as mitigation for wildlife associated with the Central Utah Project. In 1998, the United States received title to approximately 333 acres of surface estate from the State of Utah within the Ashley NF's Flaming Gorge National Recreation Area and about 7,150 acres of mineral estate was received from the State of Utah in various parts of Ashley NF. These properties were acquired as part of the Utah Schools and Lands Exchange Act. In 1999, approximately 2,433 acres of Ashley NF in and around the community of Dutch John were transferred to the Department of the Interior for eventual sale into private ownership. Currently, no specific National Forest lands are identified for disposal.

Right-of-Way Corridors: The Forest Plan identifies existing utility rights-of-way and designated two right-of-way corridors or windows. These right-of-way corridors or windows are: Red Mountain to Carter Dugway Window through portions of the Flaming Gorge and Vernal Ranger Districts; and the South Unit Window through the South Unit of the Duchesne Ranger District.

Rights-of-Way Acquisitions: The 1986 Forest Plan requires completion of identified rights-of-way acquisitions by the end of the first decade of plan implementation. In October 1987, the Forest Right-of-Way (R/W) Plan identified about 40 rights-of-way that the Ranger Districts thought were necessary to provide improved public access to the Ashley NF. In 1995, the R/W Plan was updated and identified 19 such acquisitions to be purchased over a period of seven years (i.e., from FY95 through FY2001). This program has lagged due to lack of funding and unwillingness of private landowners or the Ute Tribe to authorize public access through their property.

The Ashley NF presently has 49 rights-of-way/easements, which provide public access to the Forest through adjoining private, tribal, and BLM-administered public land. The Ashley NF acquired nine of these rights-of-way from the BLM since approval of the Forest Plan in 1986.

Occupancy trespass: Incidents of unauthorized occupancy have generally been resolved through land tenure adjustments under the Small Tracts Act. Several trespasses have been identified with little progress achieved due to funding limitations. There are known cases of trespass but limited action have taken place in most cases. Forest boundary markers are either missing or additional markers need to be surveyed in and installed. The Forest Plan requires resolution of existing title claims and encroachments cases on a priority basis.

Surveys of the Ashley NF: Most of the Ashley NF boundary has been established and posted. Currently, much of the boundary line is in need of refurbishment and in some cases a new survey. Since implementation of the Forest Plan in 1986 an estimated 27 miles of boundary line surveying has been completed; about 16 miles of which were completed in the last three years. Additional boundary line surveys would be required during the next decade or more, and would include finishing the Dutch John survey, Linwood Bay, Crystal Ranch-Yellowstone, Kettle Creek, and Indian Canyon surveys.

Recreation residences surveys for Half Moon Park Group in the FGNRA Ranger District, Uintah River Group and an isolated cabin in Uinta Canyon in the Vernal District, and the Oaks Park and Deer Lodge Group have been tasked to surveyors and still need to be completed. Small Tract Act surveys involving the Massey and Yellowstone Ranches within the Vernal District, and Roosevelt Ranger Districts, respectively, also need to be completed.

Special Use Management: The Ashley NF, through the Ranger District Offices, processes and administers non-recreation special use permits for a variety of commercial projects

ranging from roads, power lines, and water pipelines to small dams and reservoirs. Approximately 107 non-recreation special use permits have been issued since implementation of the Forest plan. Requests for non-recreational special use permits are increasing.

Communication Sites: Inquiries concerning new communication sites and additional uses on existing sites are increasing. Requests for use of existing administrative sites by public users appear to be on the rise (e.g., Request from State of Utah for radio/equipment space in Ashley NF's East Ridge Communication Facility in 2004 for homeland security purposes). Cellular technology has developed since 1986 and the need for local facilities is also increasing.

Communication site development and management plans are needed to accommodate existing and new users. Communication site plans have not been prepared for several existing sites. Grizzly Ridge is the closest such plan and is still in preparation phase.

Withdrawals: Prior to the passage of the Federal Land Policy and Management Act (FLPMA) of 1976, withdrawals generally took the form of an Executive Order, Public Land Order, or a Secretarial Decision. Generally speaking, these executive actions, once they were published in the Federal Register, segregated the affected federal land from mineral entry or location under the General Mining Act of 1872. Since approval of the Forest Plan in 1986, six withdrawals were revoked and one partially revoked within the Ashley NF. These revocations affected the Uintah River, Elk Horn, Adams, and Jackson Administrative Sites (475 acres), Dowd Springs Picnic Area & Restroom (40 acres), Hacking Lake Campground (14 acres), and a portion of the Lodgepole Campground (10 acres). Roughly 12,000 acres remain withdrawn for various and sundry administrative purposes, including improved campgrounds, caves, special geologic areas, etc. The White Rock Cave (100 acres) and the Sheep Creek Canyon Geologic Area (3,609 acres) withdrawals were extended until 2014, and 2019, respectively.

The FLPMA directed that all withdrawals be reviewed for continuation or revocation prior to 1992. At the time the Forest Plan was approved in 1986 the Ashley NF had approximately 20 administrative sites (1,433 acres), 43 recreation areas (11,213 acres), 16 reclamation projects related to the Central Utah Project (28,969 acres), reservoir withdrawals for Colorado River storage projects (128,669 acres), and 10 Federal Power Commission power site classification projects (73,332 acres).

To control mineral activities to protect other resources, and restore disturbances resulting from mining or leasing activities, the 1986 Forest Plan recommended retaining mineral entry withdrawal for the Sheep Creek Geologic Area. Therefore, with the exception of existing valid claims, the entire Sheep Creek Geologic Area is withdrawn from all mineral entry.

5.7. Wilderness

Located in northeastern Utah, the High Uintas Wilderness comprises the wild core of the massive Uinta Mountains. Characterized by the highest peaks in Utah, countless lakes, and a unique alpine ecosystem, it is among the nation's most outstanding wilderness areas. The High Uintas Wilderness is administered jointly by the Ashley and Wasatch-Cache National Forests. The Ashley NF manages over 276,000 (60%) of the 456,705 acres included in the wilderness and is designated the lead Forest in the cooperative management of the area.

The Uinta Mountains were carved by glaciers from an immense uplift of Precambrian rock. Some of this rock is exposed as colorful quartzite and shales. The main crest of the Uinta Mountains runs west to east for more than 60 miles, rising over 6,000 feet above the Wyoming and Uinta Basins to the north and south. Massive secondary ridges extend north and south from the crest of the range, framing glacial basins and canyons far below. This rugged expanse of peaks and flat-top mountains is the largest alpine area in the Intermountain West and is the setting for Kings Peak, the highest peak in Utah. Hundreds of picturesque lakes, streams, and meadows are nestled within beautiful basins. Cold, clear rivers plunge from the basins into deep canyons that form the headwaters of Utah's major rivers.

The Uinta Mountains rise from 7,500 to 13,528 feet at the summit of Kings Peak, offering diverse habitat for a wide variety of flora and fauna. Above treeline, tundra plant communities thrive in the harsh climate of the highest altitudes. Thick forests of Engelmann spruce, subalpine fir, and lodgepole pine blanket the land below treeline. These forests are interrupted by park-like meadows and lush wetlands. In the lower elevations, aspen groves and countless mixed species offer contrast to the scene. The Uinta Mountains are home to elk, mule deer, moose, mountain goats, coyotes, black bears, bighorn sheep, ptarmigan, river otter, several species of raptor, pine marten, and cougar, to name a few. Occasionally, rare wolverines are spotted, and these mountains may be home to the elusive lynx.

The High Uintas Wilderness boasts 545 miles of trail, which may be accessed from a number of trailheads surrounding the wilderness near the gateway communities of Duchesne, Roosevelt, and Kamas, UT and Evanston and Mountain View, WY. Most of these miles (about 450) are located on the Ashley NF. This extensive network of trails leads visitors deep into the wilderness, through thick forests, past rushing streams and placid lakes, to sweeping alpine vistas below majestic peaks. The opportunities for wilderness exploration are endless.

The High Uintas Wilderness was designated as such under the Utah Wilderness Act of 1984, pursuant to the Wilderness Act of 1964. Consequently, management objectives stem from these two acts of Congress. Broadly stated, the High Uintas Wilderness is to be managed exclusively for:

- Natural conditions and wilderness character or “wildness”

- Ecological health and integrity
- Education on wilderness values (physical, spiritual, and experiential)
- Opportunities for solitude or primitive and unconfined recreation
- Special provisions found in both acts, such as grazing and water use

In 1997, the High Uintas Wilderness Management Plan was completed and amended the Ashley NF 1986 Forest Plan (Amendment 12). The wilderness program is primarily concerned with the implementation of Amendment 12 and, in short, keeping the wilderness “wild” while providing opportunities for wilderness-dependent recreation experiences and allowing other uses provided for by the Wilderness Act and the Utah Wilderness Act. With growing recreation use, this is an increasingly difficult, expensive, and labor-intensive task. However, with satisfactory programmatic direction in Amendment 12, most of the work is in the development and implementation of strategic management actions and tactical tools. Regulations are in place to help achieve and maintain desired conditions, and the day-to-day operation of the wilderness program includes:

- Visitor Contact & Visibility
- Site Restoration
- Wilderness Information
- Outfitter-Guide Monitoring
- Leave No Trace Education
- Trailhead Register Maintenance
- Wilderness Ed & Interpretation
- Light Sign & Trail Maintenance
- Law Enforcement
- Search & Rescue Support
- Trash Collection & Removal
- Resource Inventory & Monitoring

Existing Conditions and Trends

Conditions in the wilderness are predominantly as they were when the High Uintas Management Plan (Amendment 12) was completed in 1997, with the exception of high-use areas and arterial trail corridors that have grown in size and number. Recreation use is moderate to high and associated impacts have increased substantially with both population growth and growth in the popularity of outdoor recreation. Management has certainly slowed the degradation, but recreation impacts to wilderness resources and experiences are outpacing management efforts to mitigate them. Management of the area is now driven primarily by the following recreation impacts:

- Loss of and changes to native vegetation
- Unsustainable use of firewood
- Damage to live and dead standing trees
- Soil compaction and erosion
- Diminished water quality
- Illegal construction of improvements

- Exposed human waste and litter
- Loss of perceived solitude and/or wildness

It's not clear whether or not the desired condition classes included in Amendment 12 captured existing conditions in 1997 or were intended to represent a change from existing conditions where they differed. Either way, some areas classified as Class II now generally appear to be Class III and some areas classified as Class I now generally appear to be Class II. This is most likely evidence of "class creep" caused by increasing recreation use.

It is becoming increasingly difficult to achieve and maintain desired conditions in each of the three condition classes in the wilderness. Conditions in large portions of the wilderness still conform to those prescribed by Amendment 12. However, conditions in many areas do not and will likely never again without aggressive management action. In these areas, public demand for wilderness experiences far exceeds the area's capability to supply and/or sustain such opportunities. The areas of concern predictably and almost universally center on bodies of water (lakes), except for the Kings Peak ascent corridors.

Unfortunately, quantitative comparisons with 1986 or even 1997 are difficult to make given the quality and quantity of available data. Very little longitudinal monitoring has been done relative to recreation impacts and the draft monitoring plan, pursuant to Amendment 12, has not yet been implemented. However, campsite inventories, firewood surveys, trailhead registers, ranger reports, and anecdotal evidence all confirm the increases in use and impacts described above.

5.8. Potential Risks to Social Sustainability

Unmanaged Recreation

Recreational activities have increased dramatically on the Ashley NF since 1986. This has required the Forest Service to address and manage most forms of recreation in order to continue to provide opportunities desired by the public, while maintaining the Forest's lands and resources. More people are now experiencing the Forest by using off-highway vehicles (OHVs), which have allowed the public to access more areas on the Forest as technology has advanced with these motorized vehicles. The popularity of OHV use has prompted the Forest service to better manage their use on National Forest Service lands.

Unmanaged recreation was identified as one of the four threats to the health of the Nation's Forests and Grasslands. Former Forest Service Chief Dale Bosworth said, "We believe that off-highway vehicles are a legitimate use of the National Forest System. But it's a use that should be managed carefully. That's what our new rule for OHV use on National Forest system lands is all about: providing access that can be used and enjoyed into the future. And if we want to sustain that use, then we've got to work together."

Forest health

Landscapes on the eastern half of the Forest still show evidence of an extensive mountain beetle outbreak in the 1980s. Other parts of the Forest are currently experiencing high

levels of tree mortality from insect and disease outbreaks. This affects social values by changing scenic qualities, impeding travel through forests where there are large amounts of deadfall, and increasing the risk of severe and/or large scale fire events. Major fire events can jeopardize recreation facilities used by Forest visitors, alter future scenic values, and change ecosystem services provided for Forest users and nearby communities (such as water quality and water yield). Management to reduce fuel loads carries its own set of tradeoffs, such as smoke and temporary closures for prescribed fires or short-term loss of scenic integrity as a result of timber sales. Addressing these tradeoffs, while accomplishing forest restoration projects, will be a major challenge in the next planning cycle.

Wilderness management

Social values in the High Uintas Wilderness are linked to maintenance of the pristine conditions visitors expect to find in a designated wilderness area. These values are at risk from increasing visitor use as well as the ecological factors discussed for the various ecosystems represented; especially alpine systems. Fire restrictions have been placed on certain high use areas because dead wood has been depleted by campers, affecting scenic and ecological values. Air quality and visibility are growing concerns as pollutants from nearby urban areas and other sources accumulate. Invasive, non-native species have been controlled fairly successfully so far but will take continued vigilance to prevent accidental introductions via pack stock, humans, or other vectors. Monitoring in remote areas is logistically difficult and expensive, yet will become more critical as social and ecological pressures on wilderness increase.

5.9. 1986 Forest Plan Desired Future Conditions

5.9.1. Recreation

Desired future condition for Recreation in the 1986 Forest Plan states that the recreation facilities, including the trail system and dispersed areas and developed sites will be upgraded and maintained at acceptable standards and new improvements added to provide for meeting public resource needs. The present mix of various recreation activities and opportunities that exist today are expected to continue into the future.

5.9.2. Facilities

Desired future condition for Facilities in the 1986 Forest Plan states that the number of buildings will be further reduced from present inventory where they are seldom used or uneconomic to maintain. Housing will be provided only at remote locations, or where suitable quarters are not available in the private section for employee purchase or rental.

5.9.3. Roads

Desired future condition for Roads in the 1986 Forest Plan states that development of areas as a result of timber harvest activities and associated roading will occur at about the same rate as in the past. Roads will be temporary and will be closed upon completion of timber activities. About the same number of miles of roads will be open for public use, but access will be more uniformly distributed across the Forest, than at present. Several arterial routes serving the Forest and other public lands will probably transfer to County

State jurisdiction. Criteria for the Forest Travel Map have been incorporated into the Forest Plan and will be updated annually.

Goals for Recreation in the 1986 Plan are:

- Provide a broad range of recreation opportunities within land capabilities and according to recognized public need.
- Identify and protect significant historic, cultural, and natural aspects of our natural heritage.

The goal for Facilities in the 1986 Plan is:

- Design and manage Forest facilities to protect Forest resources and public safety.

5.9.3.1. Major changes since 1986

Public participation in outdoor recreation and nature based tourism recreation has dramatically grown since 1986. Accurate recreation data is an information gap, which makes supply and demand determinations difficult. The following changes since 1986 affect current management of the Ashley NF's recreation program:

- Developed recreation site management has changed. Previously operated and maintained by the Forest, most developed sites are under special use permit and run by concessionaires. Developed sites not under concessionaire management are under fee demo, which is another new program. Visitors are willing to pay to recreate and their expectations expand as they do.
- Occupancy use limits for camping on the Forest have changed to 16 days. Camping in Sheep Creek Canyon is permitted. Fee collections have changed. Facility replacement schedule is unobtainable.
- The number and type of motorized vehicles have increased creating resource impacts and requiring a large dedication of time and financial resources to manage. Snowmobile use is the second most popular winter sport in the country and this increase is seen locally. Larger more powerful machines allow greater access resulting in more impacts.
- Adventure sports are now popular recreational activities. Mountain biking, spelunking, and rock climbing are new additions to the recreational menu.
- Visitor use was previously estimated using RIM/RISS data. Accurate National Visitor Use Monitoring information is now available.
- Many semi-primitive areas have been impacted by OHV use causing a shift in the ROS classification toward the roaded natural side.
- A Forest Niche has recently been developed and niche identification will identify focus areas.
- In 1986 Showcase Management was funding many projects in the NRA. Some of these facilities were not completed while others were overbuilt. Today's facilities are deteriorating facilities and operated below standard.
- The focus of multiple-use of National Forest land has shifted away from commodities and moved toward recreation and related amenity uses.

- The recently designated Scenic Byway showcases outstanding NF scenery. Driving for pleasure and sightseeing is one of the fast growing recreational activities.
- Visitor attitudes and appreciation for outdoor recreation has changed. Physiological benefits of outdoor recreation are now recognized as a vital part of overall health.
- Recreational camping vehicles are significantly larger and visitors require more amenities such as hook-ups. Developed facilities have not kept up with these changes.
- Current dispersed recreational users tend to bring more motorized equipment and occupy larger areas than in the past.
- Dispersed recreation is described as that which takes place outside of developed sites, however many users depend on ramps (developed) to access the dispersed sites, therefore the definitions (developed and dispersed) maybe too broad for recreation issues today.
- The legislated Dutch John land exchange changed the management of the area immediately surrounding the town-site.

5.9.3.2. Need for Change

The direction in the 1986 Forest Plan regarding recreation resources is outdated. Goals in the 1986 Forest Plan are simple and clear, but do not address the current complexity of public recreation interests. Many of the objectives are not being met because they do not pertain to the current situation or user conflicts and protection of resources rely on standards and guidelines that have been poorly implemented and are often at conflict. In addition, the 1986 Forest Pan does not have a strategy to deal with rural tourism, facility replacement, and unmanaged recreation, which are listed in the plan.

Special uses for recreation resources were not addressed in the 1986 Forest Plan; therefore, no standards and guidelines exist to direct these uses. Special use permits for outfitters and guides provide some visitors with outdoor experiences that they would not be able to have on their own, however, there needs to be a strategy that identifies capacity thresholds for these permits.

The socioeconomic setting as described in the 1986 Forest Plan needs updating. There was no discussion of the social and economic impacts from recreation activities on local communities. The description should be expanded to include new population data, use trends, and data from National Visitor Use Monitoring surveys. Likewise, Recreation Opportunity Spectrum (ROS) management objectives and standards need to consider new activities and use patterns.

5.9.4. Scenic Resources

The 1986 Forest Plan did not identify Desired Future Conditions or Goals for the topic of Scenic Resources. The Forest Plan did identify two broad objectives under Recreation that state, “Implement and manage for adopted visual quality objectives” and “Rehabilitate or mitigate (high priority) visually unacceptable conditions on the Forest.”

Standards and guidelines were listed under this visual quality objective under the Recreation heading.

5.9.4.1. Major changes since 1986

In 1995, the Forest Service revised the Visual Management System (VMS) to improve the interface with Forest planning needs and to be more applicable to current forest management. The new Scenery Management System (SMS) describes scenery as an integral part of ecosystem management for all levels of assessment and planning.

5.9.4.2. Need for Change

During the preparation of the 1986 Forest Plan, a Visual Management System was implemented. This system included: 1. Classification of scenic quality and esthetic concern on National Forest System Lands; 2. Establishment of quality objectives for alteration of the visual resource; 3. Interdisciplinary involvement for all alternative evaluation of management activities; 4. Implementation of the visual resource in land management planning; and 5. Recognition of the visual strength of natural landscapes and their inherent capability to accept alterations. The land unit for evaluating scenic quality for the landscape for the 1986 Plan was the “landtype” (USDA Forest Service 1993).

It was later determined that some basic elements were missing in this system such as integration with forest planning, ecosystem management, and with all levels of project development including implementation. In addition, the use of the landtype to evaluate the value of scenery proved to be too small and produced a lot of detailed designations that didn’t make sense for establishing visual quality objectives. The new Scenery Management System includes these elements and provides for a more consistent method of evaluating quality of the scenery and developing objectives. The SMS also provides for greater public input.

5.9.5. Heritage

The 1986 Forest Plan did not identify Desired Future Conditions or Goals for the topic of Heritage Resources. The Forest Plan did identify a broad objective under Recreation that states, “comply with national legislation pertaining to cultural resource management.” Standards and guidelines were listed under this cultural resource management objective under the Recreation heading.

5.9.5.1. Major changes since 1986

Numerous major technological changes have occurred since 1984 that have allowed better collection and organization of data for heritage resources. With these technological advances, the Forest Service has required annual reporting of the collected data. This new level of reporting has changed priorities so that reporting requirements such as deferred maintenance needs are recorded in order to protect or stabilize cultural sites.

There was very little vandalism or interest in high elevation sites when the 1986 Forest Plan was written. However, the number of vandalized sites has increased dramatically in

the last few years. In 2004, the Ashley initiated its first criminal investigation of damage under the Archaeological Resources Protection Act (ARPA).

Regulations that influence the management of heritage resources have been added or changed since the 1986 Forest Plan. Section 106 of the National Historic Preservation Act (NHPA) enacted in 1966 requires that federal projects look at their Area of Potential Effect (APE) or the area that is going to be affected by the project and then requires the federal administrative unit to evaluate what historical properties are going to be damaged. Section 106 was recently revised in 1999 and 2004. These new regulations increase tribal consultation, increase SHPO involvement, increase public involvement and streamlines the Advisory Council on Historic Preservation (ACHP) and SHPO's 30 day response period.

Native America Graves Protection and Repatriation Act (NAGPRA) was created in 1990 and deals with the repatriation and protection of Native American graves and funerary objects, sacred objects still used to practice traditional religion and objects of cultural patrimony or objects with ongoing historical, traditional, or cultural importance to a tribe. On the Forest, NAGPRA is most likely to go into effect if burials are located.

Executive Order 13007 was created in 1996 and requires that federal agencies confidentially and without causing adverse effect to the physical integrity, protect and provide access to and ceremonial use of, Indian sacred sites by Indian religious practitioners. Agencies, such as the Forest Service are also required to provide notice to Indian tribes of actions that might affect sacred sites or access to or ceremonial use of such sites in a manner that respects government-to-government relations between the U.S. government and Indian tribal governments.

Preserve America Executive Order 13287, recently created by President George W. Bush in 2003, helps the government build preservation partnerships with state and local governments, improve Federal agency planning and accountability, improve Federal stewardship of Historic Properties, promote Heritage tourism and enables the creation of new interpretive and educational material to help the public better understand and appreciate their historic past.

The Forest Service as an agency has also put more emphasis on the management heritage resources. For example, on December 21, 1992 Forest Service Chief Dale Robertson changed the name of the Cultural Resource Program to the Heritage Program. With the letter came a call to balance the program between the support function (Section 106), which provided project inventory, site evaluation, mitigation, and curation with the program (Section 110), which was non-project inventory, interpretation, public participation, and protection of sites. In September 1999, the Forest Service released a National Heritage Strategy. This strategy provided a vision and outlined a desired future condition. It also provided three areas of emphasis: Stewardship, Public Service, and Context for Natural Resource Management. In addition, an October 9, 1991 letter from Forest Service Chief Dale Robertson describes the point in the NEPA process when cultural resource inventories will be completed. Chief Robertson stated, "this compliance

process (36 CFR 800), including documenting, and appropriate consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, must be completed before the Decision Notice or Record of Decision.

5.9.5.2. Need for Change

The Ashley NF has been relatively successful in complying with Section 106 of the National Historic Preservation Act. However, there was no direction for complying with Section 110 of the act in the 1986 Forest Plan. Direction in the 1986 Forest Plan does not accommodate changes in the areas of tribal consultation or provide an emphasis on the requirements of Section 110 of the National Historic Preservation Act. These actions focus on site protection and identification. No emphasis or encouragement was given to improve internal awareness or to initiate programs promoting public education, awareness, and participation. There was also no direction for integrating heritage into other resource planning or projects. This is important because heritage, for instance, could provide valuable information about past climatic or environmental regimes that would assist fire or range management planning and project implementation.

The current Forest Plan does not describe a desired future condition for heritage resources and provides little direction other than “comply with national legislation.” In order to comply with national legislation, a series of steps were listed and called standards and guidelines that would bring the Ashley NF into compliance. However, these standards and guidelines state that all areas with high site potential will be surveyed by 1990 and areas with moderate to low site potential by 1995. In other words the entire Forest would be surveyed for cultural resources by 1995. A complete inventory of the Forest is not feasible with current budget and personnel. The standard of “prevent damage to any significant cultural site” is not achievable or practical.

The standard in the 1986 plan that requires a plan for interpretation and site protection is still warranted. More importantly is a plan for how the Forest will comply with Section 110 of the National Historic Preservation Act. The Ashley has become a leader in public involvement and student education without any guidance from the plan. We have accomplished this by implementing the new heritage strategy and following direction from the chief.

The Ashley NF has relied almost exclusively on federal archaeologists for compliance surveys over the last 20 years. No more than 1 or 2 contract archaeologists ever visited the office during a particular calendar year. With an increase in oil and gas activity and effort to require proponents of activities bearing the financial responsibility for cultural resource clearance work there has been a significant increase in contractor visits and calls. A policy that outlines office procedures for permit applications, file searches, cost recovery, and permit stipulations needs to be developed.

Since 1996, the Ashley NF has assisted four university students with data collection for their masters' theses. In 2003, Utah State University conducted its archaeological field school on the Ashley NF. Negotiations for additional field schools with Weber State and Utah State University have also occurred. In the future, additional academic or

contractor partnerships will be pursued to enhance the Ashley Heritage Program's responsibilities. To provide a context and framework for research by outside partners and the Forest Service, a Forest wide research design should be developed. This research design would outline appropriate field methodology, list research issues and questions, and note current data gaps.

5.9.6. Lands

The 1986 Forest Plan did not identify Desired Future Conditions for the topic of Lands. The Forest Plan did identify goals, objectives, and standards and guidelines for Lands.

The goal for Lands in the 1986 Plan is:

- Increase public benefits and utilization through more efficient land use administration.

5.9.6.1. Major changes since 1986

Prior to the creation and implementation of the 1986 Forest Plan, the Ashley NF did not formally identify right-of-way corridors. Corridor requests were processed on a case-by-case basis. The Western Utility Group (WUG), an ad hoc organization of major western gas, electric, and telecommunications companies, has identified the long-term utility corridor needs of their member companies. The utility corridor management emphasis areas in the Forest Plan are generally consistent with the needs identified by WUG. The Ashley NF acquired nine rights-of-way from the BLM since approval of the Forest Plan in 1986.

5.9.6.2. Need for Change

The standards and guidelines listed in the 1986 Forest Plan are basically management actions rather than standards and guidelines for Lands issues on the Forest. Where the Forest Plan needs to change is setting standards that conform to existing Forest Service regulations and policy. Some standards and guidelines that could be incorporated in land ownership adjustment and other lands issues include:

- Specific land acquisition and exchange cases should be analyzed through the NEPA process on a case-by-case basis.
- Acquire and convey the entire estate when at all possible.
- All land acquisition and exchange activities meet the requirements of Forest Service regulations and policy established under FSM 5400 and 36 CFR 254.
- Lands that are difficult to manage (e.g., fragmented and/or without legal access) should be identified for disposal, all other lands within the Ashley NF should be retained in Federal ownership.
- Land deemed suitable for disposal should be disposed of via land exchange rather than sale.
- Any acquired land should be located within the existing Ashley NF boundary.
- Where needed, rights-of-way for public access should be reserved prior to disposal of any forestlands.
- No lands will be disposed of if a cultural resources survey determines that they contain sites eligible for inclusion on the National Register of Historic Places,

- unless appropriate mitigation measures can be implemented. States, Counties, other Federal Agencies, and the Ute Indian Tribe will be consulted on cases that might affect them and/or their programs.
- Third party facilitators may be used in land purchases and/or exchanges when their assistance would facilitate the project.
 - In projects involving a facilitator it must be evident that the project is based on enhancing resource management objectives and that using a facilitator is in the best interest of the United States.

The Ashley NF right-of-way corridors need to be re-assessed in the context of today's access needs. For example the Red Mountain to Carter Dugway Window has not been used since Forest Plan implementation. This route is not identified by the WUG and location of major utilities within this area may impact critical resources (i.e., lynx habitat, cultural resources-including the Carter Military Road, etc.). The South Unit Window needs to be adjusted to a narrower corridor, on the order of ½ mile on either side of the existing Sowers Canyon Road. Such action would be compatible with the WUG corridor planning and would avoid impacting the Lance Canyon Research Natural Area. Also, there is a potential need to identify a corridor, preferably an existing utility right-of-way, through the eastern portion of the Flaming Gorge Ranger District east of Little Hole.

The 1986 Forest Plan does not address designating communication sites or management plans for these sites. Designation of communication sites is needed because these are long-term commitments of these land areas on the Forest. In addition, by designating existing sites and completing communication site plans for these sites, future requests for new or additional uses can be reviewed and action taken in a more timely and efficient manner. The revised plan also needs to look at technological changes that may affect future site selections such as cellular phone facilities, etc.

Periodic reviews of existing withdrawals will need to be completed as funding is made available for such purposes. In addition, new withdrawals requiring NEPA analysis and publication of Public Land Orders may be needed to protect critical resource values as the need arises.

5.9.7. Wilderness

The 1986 Forest Plan did not identify Desired Future Conditions for the topic of Wilderness. The Forest Plan did identify goals, objectives, and standards and guidelines for Wilderness.

The goal for Wilderness in the 1986 Plan is:

- Administer the High Uintas Wilderness in accordance with the Utah Wilderness Act of 1984.

5.9.7.1. Major changes since 1986

In 1997, the High Uintas Wilderness Management Plan amended the Wasatch-Cache National Forest Plan (Amendment 29) and the Ashley NF Plan (Amendment 12). Amendment 12 includes 27 standards and guidelines categorically addressing: Air

Quality, Water & Soil Management, Vegetation Management, Fire Management, Recreation Use, Outfitted Recreation Use, and Structures & Improvements.

Amendment 12 was developed in cooperation with the Wasatch-Cache National Forest with extensive public involvement and employed an interdisciplinary and comprehensive approach to wilderness management. Amendment 12 is expected to carry over into the new Forest Plan nearly as it was written in 1997. However, significant changes in monitoring requirements (standards) and possibly other minor revisions are proposed.

5.9.7.2. Need for Change

Amendment 12 describes desired conditions for the High Uintas Wilderness that are consistent with national direction and local priorities for wilderness management. Amendment 12 is relatively current and meets the joint wilderness management needs of the Wasatch-Cache and Ashley NFs. Therefore, there are no changes proposed for wilderness. However, significant changes in monitoring requirements and possibly other minor revisions are proposed.

Amendment 12 includes monitoring requirements, though it does not include detailed direction. An effort has been underway to write a complete monitoring plan for the last few years that would tier to Amendment 12 and support its implementation. Revisions to monitoring requirements are needed to address:

- Advances in relevant sciences.
- Feasibility issues.
- Errors and omissions in Amendment 12.

The monitoring plan for the High Uintas Management Plan is scheduled for completion in 2005. If approved as drafted, it will be necessary for the Wasatch-Cache National Forest to amend its new Forest Plan accordingly and the Ashley NF will be compelled to include the monitoring plan in its upcoming plan revision process.

5.9.8. Protection

The 1986 Forest Plan did not identify Desired Future Conditions for the topic of Protection (i.e., fire management, insect and disease management, and law enforcement). The Forest Plan did identify goals, objectives, and standards and guidelines for Protection.

The goal for Protection in the 1986 Plan is:

- Provide cost-efficient protection of Forest resources, users, and administrative sites.

5.9.8.1. Major changes since 1986

The Utah Fire Amendment Environmental Assessment amended the 1986 Plan in October 2000 and provided more direction for fire management.

5.9.8.2. Need for Change

The direction found in the 1986 Forest Plan focused primarily on wildland fire suppression. It did briefly mention the use of prescribed fire, but offered little insight to the use of wildland fire for a resource benefit. The 1986 Plan also lacks the direction needed to identify and prioritize fuels reduction, especially in wildland urban interface (WUI) areas. These deficiencies were not consistent with the evolving National Fire Management Policy; therefore, the 1986 Forest Plan was supplemented with the Utah Fire Amendment in October 2000.

Concerning insect disease and management, little has changed since the 1986 Plan. Techniques and technology has increased efficiency, but overall management has stayed relatively the same.

5.10. Need for Change Summary

The 1986 Forest Plan did not anticipate the amount and complexity of today's public recreation interests. Desired future conditions regarding social resources are vague, outdated, and do not exist for resources such as Heritage, Lands, Scenery, and Wilderness. Goals and objectives are also vague, difficult to measure, and outdated.

New data from surveys and assessments have helped the Ashley NF identify the types of uses that are occurring on the Forest and focus in on areas where more management needs to occur. Likewise, data gathered from cultural surveys have provided new information about areas that may be sensitive to management actions. Also new laws and regulations have been implemented for heritage resources since the 1986 Forest Plan, which need to be incorporated in the revised Forest Plan. In the case of scenic resources, a whole new protocol has been adopted and needs to be incorporated as well.

Many of standards and guidelines listed in the 1986 Forest Plan are lists of management actions rather than standards and guidelines. New standards and guidelines need to be established based on current resource information and new Forest data. These new standards and guidelines also need to be designed to conform to existing or new Forest regulations and policy. Monitoring requirements and schedules also need to be revised based on the most current information and best available science.

6. Economic Conditions and Trends

6.1. Introduction

The Ashley NF falls predominantly within 4 counties on the northern border of Utah and Wyoming. Daggett, Duchesne, Sweetwater (in Wyoming) and Uintah counties contain almost the entire planning area and draw a portion of their social and economic character from the National Forest. Summit and Wasatch counties contain smaller shares of the Ashley NF and can be considered economically integrated with other analysis area counties since they are part of the same Economic Area designated by the Bureau of

Economic Analysis (BEA)¹⁰. Utah County also falls within the BEA's Economic Area but contains the smallest portion of the National Forest and has closer social and economic affiliations with the Wasatch front rather than the Ashley NF area. Addition of this county to the analysis area would also mask important social and economic relationships with other counties given its unique character. Uinta County, Wyoming is also included in the analysis area given social and economic ties to the ranching, logging and wood products industry.

The analysis of the functional economic area impacted by management of the Ashley NF includes Daggett, Duchesne, Sweetwater (Wyoming), Uinta (Wyoming), and Uintah and Wasatch counties. Estimates of the area economic contribution of Ashley NF management were developed with an input-output modeling tool called IMPLAN. Input-output models describe commodity flows from producers to intermediate and final consumers. The total industry purchases are equal to the value of the commodities produced. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services continues until leakages from the region stop the cycle. The resulting sets of multipliers describe the change of output for regional industries caused by a change in final demand in an industry. The IMPLAN database describes the economy in 509 sectors using federal data from 2006¹¹. These sectors are further aggregated to better identify areas relevant to Forest Service management activities.

The following description of the Ashley NF will focus more on the counties that contain most of the National Forest (Daggett, Duchesne, Sweetwater Uinta, and Uintah counties). These counties reflect similar trends and values in the remaining areas adjacent to the Ashley. Special attention will be given to smaller communities that contain characteristics unique to the area. Certain defining features of every area influence and shape the nature of local economic and social activity. Among these is the local history, population, the presence of or proximity to large cities or regional population centers, types of longstanding industries such as agriculture and forestry, area racial and cultural characteristics, predominant land and water features, and unique area amenities. The Ashley NF operates as a steward of many of these area resources and opportunities and thus plays a principal role in the community. This document gives further insight on the character and extent of these community connections.

6.2. History

Much of the area draws its historical and cultural traditions from the greater Uintah Basin area. People identified with the Fremont Culture occupied the Uinta Basin about 3000 years ago. Their agrarian lives contrasted to the hunters and gathers that preceded them.

¹⁰ These economic areas represent the relevant regional markets for labor, products, and information and are mainly determined by commuting patterns. This delineates local labor markets and also serves as a proxy for local markets where businesses in the areas sell their products (US Department of Commerce, 2004)

¹¹ IMPLAN data is derived from a variety of sources included the Bureau of Economic Analysis, Regional Economic Information System (REIS), Bureau of Labor Statistics, U.S. Census, etc.

The people of the Fremont Culture lived in kivas (semi-buried shelters) and were sustained primarily by corn agriculture hunting, and fishing. From about 1300 to the present, the basin has been occupied by a band of the Utes called the Uinta people. Throughout prehistory and history, the Uintah Basin has provided food, clothing, and shelter and has sustained the cultural traditions and the daily life of its inhabitants. In 1776, the Dominguez and Escalante expedition entered the Uintah Basin opening the area to Spanish, and later Mexican, American, and British fur-trappers. The rush for fur bearing animals that followed was the areas first economic boon. In the 1830's two trading posts were established; Fort Robidoux, (1830s-44) and Fort Kit Carson (1833-34). In the 1840s Captain John C. Fremont visited the area on an US Government expedition. Later, John Wesley Powell explored the area floating down the Green River from Green River, Wyoming in 1869 and again in 1871. In the early 1870s, Mormon ranchers and other whites, who used the land predominantly for cattle ranching, began filtering into the Ashley Valley. In 1880 Uintah County was formed from Wasatch County.

Soon after, asphaltum minerals were discovered in the area ushering in a second wave of area expansion. Indian reservations were opened to outside development by miners and settlers. In 1905, thousands of homesteaders rushed to Grand Junction, Colorado, and to Vernal, Price, and Provo, Utah to register for land drawings. The area proved difficult to homestead and many gave up their farming efforts. However by 1915, the population had grown enough for Duchesne County to be formed from Wasatch County (Fuller, 2007).

Commercial oil production began in 1948 by the Equity Oil Company which had an initial flow of about 300 barrels a day from its Ashley Valley No. 1 well. Production and accompanying economic impact to the area have varied with price. With the increase in the price of crude oil in the 1970s commercial oil production took off in the area. Growth in jobs and personal income occurred alongside shortages of housing and increased school enrollments. After the fall of oil prices in the early 1980s, area economic well being decreased. The Uintah Basin is currently experiencing economic growth due to increased oil and gas activity (University of Utah 2007).

In the recent past, the area has become more dependent on tourism and the service sectors. The Uintah Mountains, Blue ribbon trout streams, and the Flaming Gorge attract visitors and residents to the area. Growth in counties along the Wasatch Front has provided some of this increased visitation. For example, Park City has acquired a reputation as an upscale getaway, bringing recreationists and new development to the area.

6.3. Demographic Overview

Population change since 1970 is displayed below in Figure 1. According to the US Census Bureau, Daggett, Duchesne and Uintah counties increased in population by 37, 24 and 26 percent, respectively between 1990 and 2006. Sweetwater County experienced an overall 0.2 percent decrease with a slight increase in population between 2000 and 2006. Uinta County, Wyoming increased by 8 percent between 1990 and 2006. All of these counties experienced growth less than their respective states (48 percent in Utah and 14

percent in Wyoming) over this period however, counties along the Wasatch Front, adjacent to the Ashley NF, experienced much greater percent changes in population than the state over this period; Summit County increased by 129 percent while Utah and Wasatch counties increased by 76 and 101 percent, respectively (Table 6-1). These population changes have driven increases in recreation use, leading to adjustments in the economic structure of the Ashley NF area.

The four counties containing large portions of the National Forest have relatively small population densities ranging from 1.4 people per square mile in Daggett County to 6.2 in Uintah County. Uintah County, WY is slightly higher containing 9.7 people per square mile, while counties along the Wasatch front adjacent to the Ashley have much higher population densities.

Table 6-1. Population change in counties and towns in the area

	1990	2000	2006	Change
UTAH	1,722,850	2,233,169	2,550,063	48%
Daggett County	690	921	947	37%
Manila	207	308	303	46%
Duchesne County	12,645	14,371	15,701	24%
Roosevelt	3,915	4,299	4,681	20%
Duchesne	1,308	1,408	1,506	15%
Summit County	15,518	29,736	35,469	129%
Park City	4,468	7,371	8,044	80%
Coalville	1,065	1,382	1,419	33%
Uintah County	22,211	25,224	27,955	26%
Vernal city	6,644	7,714	8,163	23%
Utah County	263,590	368,536	464,760	76%
Provo	86,835	105,166	113,984	31%
Wasatch County	10,089	15,215	20,255	101%
Heber	4,782	7,291	9,775	104%
Midway	1,554	2,121	3,117	101%
WYOMING	453,588	493,782	515,004	14%
Sweetwater County	38,823	37,613	38,763	- 0.2%
Green River	12,711	11,808	11,933	- 6%
Rock Springs	19,050	18,708	19,324	1%
Uinta County	18,705	19,742	20,213	8%

Source: US Census Bureau, Population Finder

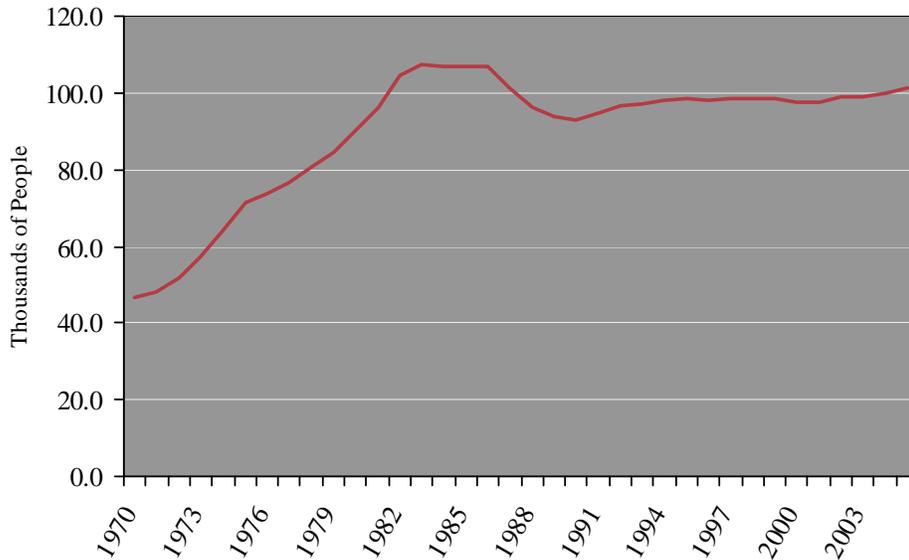


Figure 6-1. Annual population change within Daggett, Duchesne, Sweetwater, Uinta, WY and Uintah, UT counties

The BEA estimates the flow of annual earnings of in-commuters and out-commuters for a given county. Commuting data for Duchesne and Uinta counties suggest they can be described as bedroom communities since income derived from people commuting out of the county to work exceeds the income from people commuting into the counties (U.S. Department of Commerce 2005). Daggett, Sweetwater and Uintah counties can be described as employment hubs since income derived from people commuting into the counties to work exceeds the income from people commuting out of the county.

The degree of commuting varies; in 2005 the difference between the outflow and inflow of earnings was 37.3 percent of total county income for Daggett County while only 3.3 and 7.7 percent in Uintah and Sweetwater counties respectively. Due to Daggett County's small population it is not surprising that area income would be generated by those living outside of the county. Duchesne and Uinta counties had a 12.7 and 14.9 percent net difference in income in 2005 indicating a moderate level of commuting for the area. Many of those commuting to the employment hubs may in fact be commuting from these bedroom communities.

The population in all five counties has aged since 1990. Daggett County is comparatively older than the rest with an average age of 39.2 years in 2000 – up from 31.9 years in 1990. In all five counties the age groups less than 20 years of age have decreased as a share of the total population, while those older than 40 have increased. Between 1990 and 2000 the largest and fastest growing age groups were between 40 and 54 years old. During the same 10 year period the age groups between 25 and 39 years old have shown marked decreases. All five counties demonstrate similar trends; an aging population occurring alongside decreases in the younger generation (U.S. Census Bureau 1990 and 2000).

In 2000 Daggett, Duchesne, Sweetwater Uinta and Uintah counties were, respectively 94.6, 90.2, 91.6, 94.3 and 87.7 percent white (U.S. Census Bureau 2000). In the year 2000, Native Americans comprised 0.8, 5.4, 1, 0.9 and 9.4 percent of the population in these counties. People of Hispanic decent have increased in number and percent of total population in these counties between 1990 and 2000 (6-2). In Daggett and Uintah counties these increases in population accounted for approximately 19 and 9 percent of the total population increase over this time frame.

Table 6-2. Number and percent of persons of Hispanic origin

	1990		2000	
	#	%	#	%
Daggett	20	2.9%	64	6.9%
Duchesne	368	2.9%	455	3.2%
Sweetwater	3503	9.0%	3606	9.6%
Uinta	801	4.2%	1095	5.5%
Uintah	743	3.3%	1004	4%

6.4. Economic Specialization and Employment

Employment distribution amongst industry sectors within the analysis area is displayed below in Figure 2. The Interior Columbia Basin Ecosystem Management Project identified communities that were specialized with respect to employment. Their method used the ratio of the percent employment in each industry in the region of interest (counties within the impact area) to the percent of employment in that industry for a larger area (the reference region; states of Utah and Wyoming). For a given industry, when the percent employment in the analysis region is greater than in the reference region, local employment specialization exists in that industry (USDA Forest Service, 1998). Using this criterion applied with 2006 data Daggett, Duchesne and Uintah counties can be characterized as specialized with respect to Government, Grazing and the combined Agriculture, Fishing and Hunting sectors. In addition Daggett County is specialized in the Arts Entertainment, and Recreation sector and the Accommodation and Food Service sector. Of particular interest, Daggett is also specialized in the Forestry and Logging sector as well as the Wood Products and Processing sector. Duchesne County is specialized in the Mining sector as well as the combined Transport, Warehousing and Utilities sector and the Arts Entertainment, and Recreation sector. Uintah County is specialized in the Mining and the wood Products and Processing sectors. Both Sweetwater and Uinta counties in Wyoming can be considered specialized in the Manufacturing sectors. In addition, Sweetwater County is specialized with respect to Mining sector and the combined Arts, Entertainment and Recreation sector. Uinta County Wyoming is also specialized in the Construction, Information, Retail Trade, and the combined Wood Products and Processing sectors (IMPLAN 2006). Over time economic specialization has changed. The degree of change is reflected in figure 3

below, where total employment in Daggett, Duchesne, Sweetwater and Uintah counties is disaggregated into six industry sectors (U.S. Department of Commerce 2000)¹².

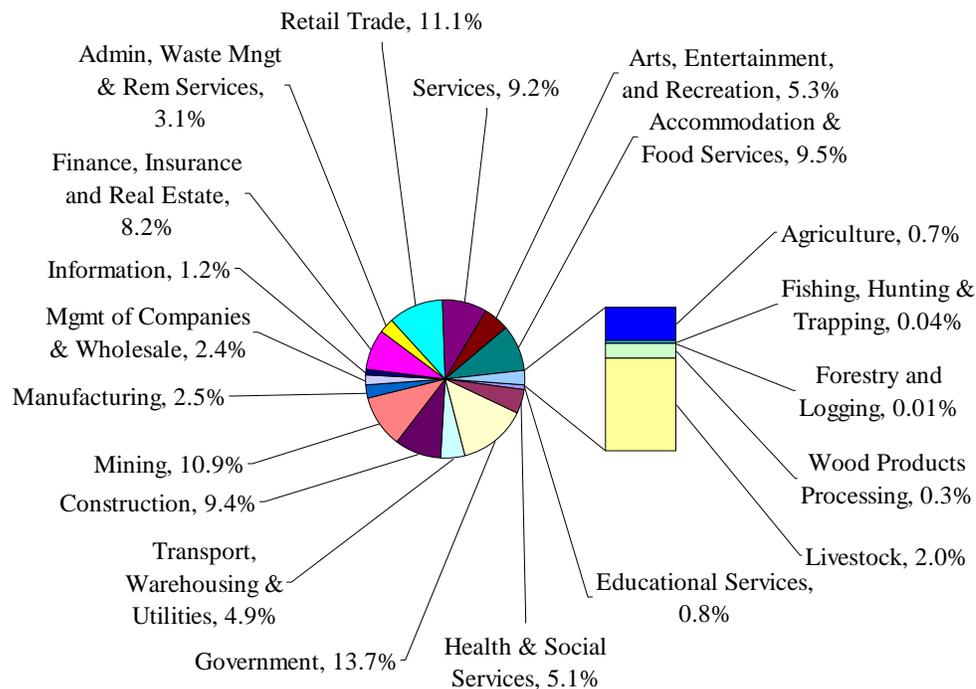


Figure 6-2. Analysis area employment distribution (IMPLAN 2006)

From 1970 to 2005, total employment in these counties increased by 222 percent (from 20,454 to 65,975 jobs classified as full and part-time employment). The state of Utah saw an increase in total employment of 232 percent, while Wyoming saw a 126 percent increase over this period (U.S. Department of Commerce, 2005b). The employment growth seen in these counties is largely due to increases between 1977 and 2000 in Service and Professional and Government sector employment; which respectively accounted for 52 and 19 percent of 2000 total employment. These shares are up from 1977 indicating an increasing area specialization in these sectors. These increases largely offset a decreased dependence on Mining and Construction sector employment which decreased by 8.6 and 3.5 percent, respectively. Slight increases in the Agricultural Services sector (includes forestry related services) and the Manufacturing sector (includes paper, lumber and wood products manufacturing) accounted for 1.8 and 7.2 percent of new employment as well (U.S. Department of Commerce 2000).

The Agricultural Services and the Manufacturing sectors have provided a small but consistent portion of total area employment. Mining and Construction have seen historic decreases in employment; however the Service and Professional sector has maintained a steady increase in area importance. Much of this Service and Professional sector growth

¹² The numbers in Figure 3 are not directly comparable to the IMPLAN numbers in Figure 2 since IMPLAN data include farm and proprietor employment in addition to wage and salary employment. Similarly the IMPLAN data also includes estimates for non-disclosures that similarly include farm and proprietor employment in addition to wage and salary employment.

can be attributed to opportunities and quality of life provided by natural amenities on the Ashley NF. Population and employment change is related to natural amenities (Knapp and Graves 1989, Clark and Hunter 1992, Treyz and others 1993, Mueser and Graves 1995, McGranahan 1999, Lewis and others 2002) often provided by National Forest lands.

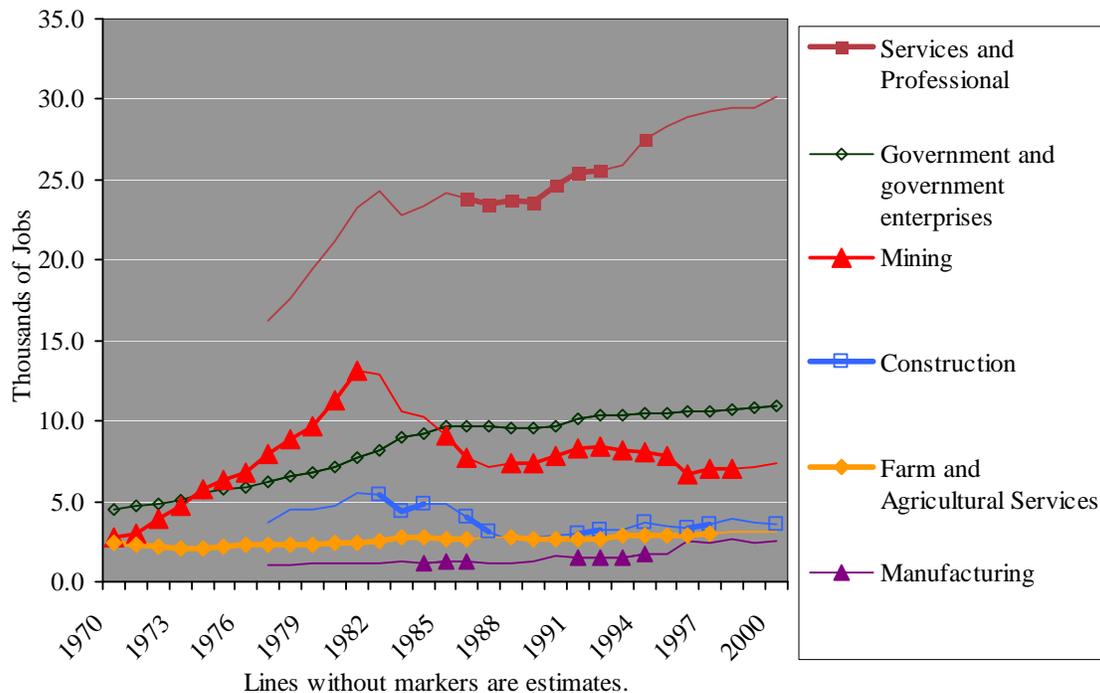


Figure 6-3. Employment history of Daggett, Duchesne, Sweetwater, Uinta, WY and Uintah, UT counties (U.S. Department of Commerce 2000; estimates from EPS 2007)

6.5. Economic Well-Being and Poverty

While the Service and Professional sector has historically offset decreases in Mining, Manufacturing and Construction, these jobs may not pay as much, which could decrease area economic well being. The private sectors examined can be lumped into Goods-Producing sectors (Natural Resources, Mining, Construction, and Manufacturing) and Service-Providing sectors (Trade, Transportation, Utilities, Finance, Education, Health, etc.). In 2005 the Goods-Producing and Service-Providing sectors paid on average \$55,206 and \$27,506 per year (U.S. Department of Commerce 2005c). From these statistics it is apparent that while the Service and Professional sector has offset decreases in Mining and Manufacturing, these jobs do not pay as much. The welfare implications of these changes are not so clear. The out-migration noted above suggests people may be moving away instead of taking lower paying jobs in the Service-Providing sectors.

Job growth during the 70's outpaced their states and the nation in analysis area counties except Uinta and Daggett counties. The economic downturn of the 1980's adversely affected the area as job growth slowed and population growth declined (see figures 1 and 3 above). In the 1990s population increases and job growth recovered, however analysis area counties in Utah stayed below state levels. From 1970 to 2005, personal income in

the analysis area added \$2.3 billion, per capita income rose from \$17,318 to \$31,121, and earnings per job increased from \$33,181 to \$40,110 (all measures adjusted for inflation to 2005 dollars) (U.S. Department of Commerce 2005d).

From 1988 to the early 2000's, unemployment in Duchesne, Sweetwater, Uinta and Uintah counties remained close to or above the national and state levels of unemployment (Figure 3 below). Daggett County experienced unemployment below or close to national and state levels during this time frame. In recent years, unemployment has dipped below national and state levels in Sweetwater, Uinta and Uintah counties while rising above in Daggett. Duchesne County's unemployment rate dropped below the national rate in 2005 and then further dropped to the state rate at 2.9 percent in 2006.

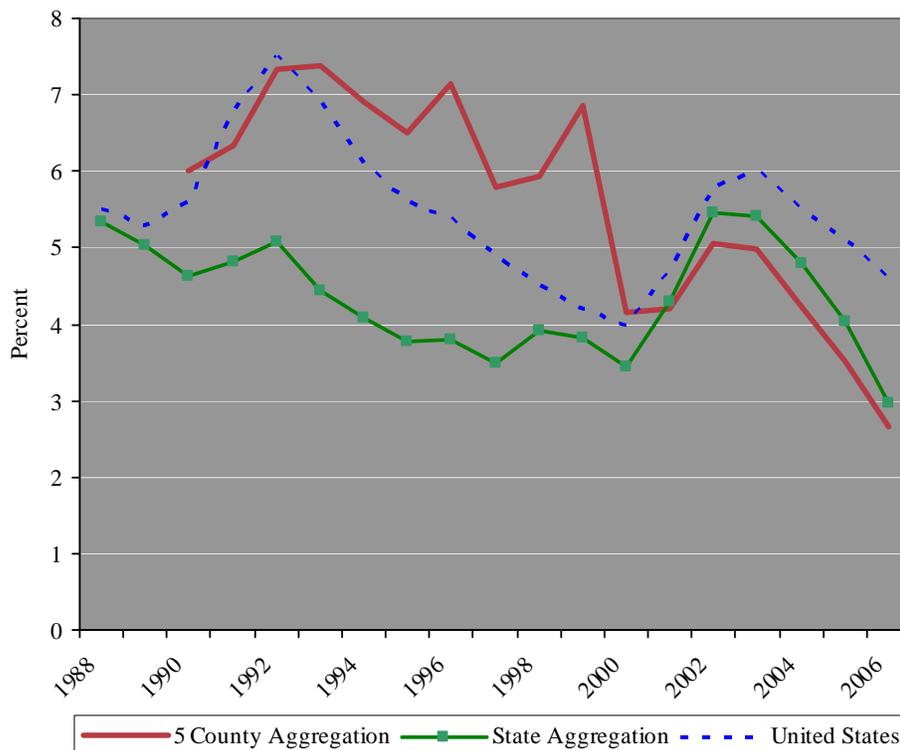


Figure 6-4. Unemployment rate of the five counties within the analysis area (Daggett, Duchesne, Sweetwater Uinta, WY and Uintah, UT counties)

The share of Duchesne and Uintah County residents living below the poverty level was above the state share in Utah between 1979 and 1999. Daggett County population below poverty was above the state share before 1989 but decreased to 5 percent by 1999, well below the state poverty rate of 9 percent. Both Sweetwater and Uintah County populations living below the poverty level remained below Wyoming's level between 1979 and 1999 (U.S. Census Bureau, USA Counties 2007).

6.6. Components of Personal Income

Further examining trends within personal income provides insight to the area economy and the connections to the Ashley NF. There are three major sources of personal income: (1) labor earnings or income from the workplace, (2) investment income, or income

received by individuals in the form of rent, dividends, or interest earnings, and (3) transfer payment income or income received as Social Security, retirement and disability income or Medicare and Medicaid payments.

In Daggett, Duchesne, Sweetwater, Uinta and Uintah counties, labor earnings were the largest source of income accounting for 75 percent of all income in 2005 (see figure 5 below for disaggregation of 2006 labor income). This is relatively similar to Utah (74 percent of total) and higher than Wyoming (64 percent of total). The Mining and Government sectors were the largest components of labor income in 2006 (figure 5 below).

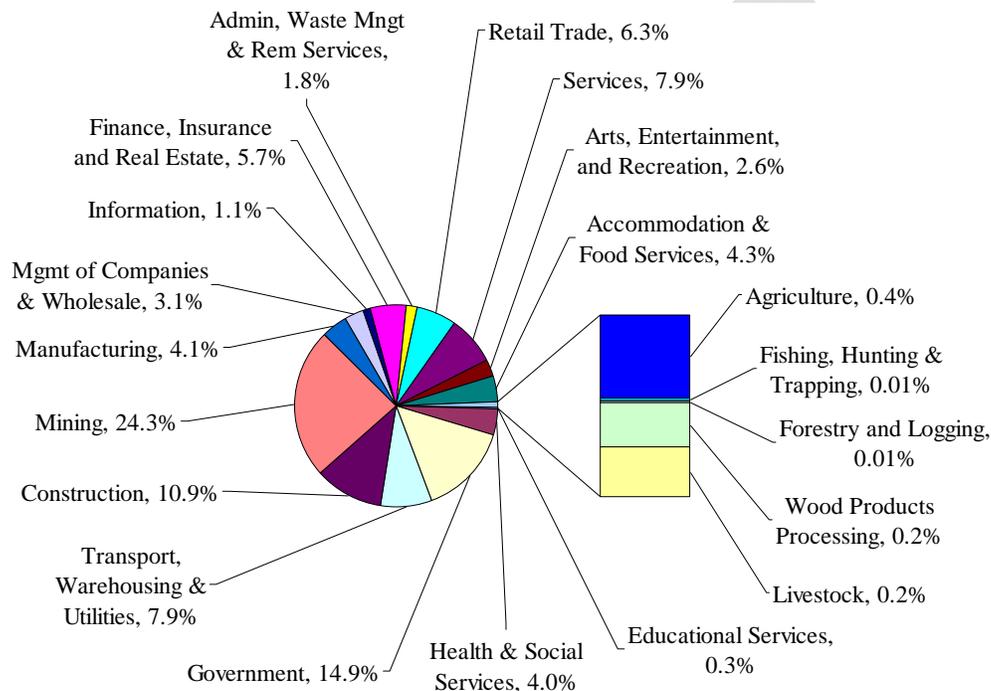


Figure 6-5. Analysis area labor income distribution (IMPLAN 2006)

Additionally 13 percent of 2005 personal income was investment income in the four counties. While labor earnings share of personal income has decreased from 1970 to 2005 (from 78 to 75 percent), the share of non-labor income has risen (from 22 to 25 percent). Investment income remained at 13 percent of total personal income while transfer payments rose from 9 to 13 percent of total personal income. The increase in transfer payments is not due to an increase in welfare, since age related transfer payments increased from 49 to 53 percent of total transfer payments while the share of transfer payments from welfare remained unchanged and unemployment payments decreased (U.S. Department of Commerce 2005e).

These patterns may reflect the aging population noted above, whom are more likely to have investment earnings than younger adults. As the population of the area continues to age, the share of income from these non-labor sources should continue to rise as long as residents continue to stay in the area after retirement or new retirees move in. Rural county population change, the development of rural recreation and retirement-destination

areas are all related to natural amenities (McGranahan 1999). Many of the natural amenities in the area are managed by the Ashley NF.

6.7. Ashley NF Contributions to the Area Economy

Land within the Ashley NF contributes to the livelihoods of area residents through subsistence uses as well as through market-based production and income generation. Public lands provide products of value to households at no or low cost (permit fees). These products include fuelwood, boughs, Christmas trees, wood posts, livestock, and materials such as sand and gravel. Additional products with subsistence value may include fish, game, plants, berries, and seeds. Use of these products is often part of tradition and sustains local culture.

Contributions to the area economy through market based production can be measured using the IMPLAN input-output model mentioned above. Using the most recent data available, IMPLAN response coefficients¹³, were applied to Forest outputs and expenditures to estimate the area economic contribution of the Ashley NF. While the discussion above examines the current situation and historical context, this analysis examines the linkages and interdependencies among businesses, consumers, and the Ashley Natural Forest resources on which some area economic activity depends. IMPLAN allows a more complete examination of these linkages.

IMPLAN not only examines the direct contributions from the Ashley NF but also indirect and induced effects. Indirect employment and labor income effects occur when a sector purchases supplies and services from other industries in order to produce their product. Induced effects are the employment and labor income generated as a result of spending new household income generated by direct and indirect employment. The employment estimated is defined as any part-time, seasonal, or full-time job. In the following tables direct, indirect and induced impacts are included in the estimated impacts of National Forest contributions.

Table 6-3. Estimated annual employment and labor income contributions from the Ashley NF by resource program

	Employment (full and part time jobs)	Labor Income (thousands of 2008 dollars)
Recreation ¹⁴	190	\$5,171.0
Wildlife and Fish Rec ¹⁴	70	\$2,011.4
Grazing	19	\$223.6
Timber	40	\$1,006.6
Minerals	0	\$22.1

¹³ Rates of change in employment and labor income as final demand changes

¹⁴ Expenditures by local residents for recreation on the Ashley NF do not introduce “new” money into the economy. If local residents could not recreate on the forest, they would likely find other forms of recreation in the area and continue to spend their recreation dollars in the local economy. Therefore, these portions of employment (and labor income below) are not necessarily dependent on the existence of the opportunities provided by the Ashley NF.

Externally Funded Activities	7	\$279.1
Payments to States/Counties	19	\$835.9
Forest Service Expenditures	239	\$10,755.2
Total Forest Management ¹⁵	584	\$20,304.9

6.7.1. Recreation

The Ashley NF provides a wide array of recreational opportunities which are enjoyed by local and non-local residents. The large expanse of relatively undeveloped lands, unique opportunities on those lands, and the fish and wildlife sustained by habitats on this land attract these visitors. On their way to the planning area and once they arrive these visitors spend money on goods and services they would spend elsewhere if these opportunities did not exist. In this manner the opportunities on the Ashley NF contribute to the local economy by attracting these visitors. Daggett, Duchesne and Uintah counties demonstrate varying degrees of employment in tourism related sectors; Daggett County employment in travel and tourism related sectors was 65 percent of all non-farm jobs in 2006 and tourism related employment increased from 190 in 1996 to 301 in 2006 (by 58 percent increase). 5 percent of non-farm jobs were travel and tourism related in Duchesne County and tourism related employment decreased from 443 to 301 over the same period (47 percent decrease). In 2006, 12 percent of all non-farm jobs were travel and tourism related in Uintah County and went from 723 to 1,580 jobs from 1996 to 2006 (119 percent increase) (State of Utah 2006).

The National Visitor Use Monitoring (NVUM) effort estimated there were 962,500 visits to the Ashley National in 2007 (USDA Forest Service 2008b). Analyses of expenditures reported by National Forest visitors show the primary factor determining the amount spent by a visitor was the type of trip taken and not the specific activity or Forest visited (Stynes and White 2005, pg 2). Six commonly used trip type segments are defined below;

Visitors who reside greater than 50 miles from the Forest and visited the Forest:

1. Non-local residents on day trips
2. Non-local residents staying overnight on the Forest
3. Non-local residents staying overnight off the Forest

Visitors who live within 50 miles of the Forest and visited the Forest:

1. Local residents on day trips
2. Local residents staying overnight on the Forest
3. Local residents staying overnight off the Forest

A seventh category of trip types is not included, non-primary visits, since we are only interested in visitors who's primary activities are on the Ashley NF. Total visits were then divided up into these trip types using the proportions provided for the Ashley NF in the NVUM report (USDA Forest Service 2008b). The largest trip-type segment and spending category was Non-local residents on day trips which numbered approximately 229,000 visits.

¹⁵ Totals do not add due to rounding.

While providing recreation opportunities to local residents is an important contribution, the recreation expenditures of locals do not represent new money introduced into the economy. If National Forest related opportunities were not present, residents would likely participate in other locally based activities and their money would still be spent in the local economy. After separating the contributions made from local residents, recreation contributes the most to the area economy of all resource programs (Table 6-3), providing 47 and 34 percent of the total Ashley NF employment and labor income contributions.

6.7.2. Grazing

Within the planning area agriculture plays an important economic and social role. Of Utah's 29 counties, Duchesne, Uintah and Daggett counties were the 7th, 8th and 28th largest cattle producers in 2007. Of Wyoming's 23 counties Uinta County was the 17th largest producer and Sweetwater was 22nd. The most recent Census of Agriculture (2007) reports the five county analysis area had 2,496 farms and ranches and of these 58 percent were engaged in cattle production; this share of farms and ranches involved in cattle production is down from 73 percent in 1997 but slightly up from 53 percent in 2002. The total cattle inventory in 2007 was 156,539 with 59,159 sheep in the five county analysis areas. In 2006 grazing on Ashley NF Land involved 105 operators.

The authorized level of grazing on the Ashley NF was approximately 66,600 head months (HMs) in 2007. This is the maximum number of HMs that could be offered under ideal forage conditions. However actual HM use varies due to factors such as drought, financial limitations on operators, market conditions and implementation of grazing practices to improve range conditions. Between 2001 and 2007, an average of 54,249 cattle, horse, and sheep HMs has been utilized annually. Table 6-4 below provides actual and authorized use numbers between 2001 and 2007. Over this time period an average of 37,945 HMs were authorized for cattle and 16,280 HMs for sheep. The numbers of cattle and sheep that could be grazed on these averages would total about 3,160 and 1,357 animals, respectively; which was 2 and 2.3 percent of the five county analysis area cattle and sheep inventory in 2007.

Table 6-4. Annual head month authorizations on the Ashley NF

Year	Actual Use	Authorized Use	Percent of Authorized
2001	66,431	92,335	72%
2002	48,583	76,086	64%
2003	52,701	88,110	60%
2004	54,317	63,842	85%
2005	42,608	63,026	68%
2006	68,157	72,037	95%
2007	48,397	66,597	73%

Source: USFS I-web

The actual use levels of grazing on the Ashley NF support approximately 17 jobs and \$209,000 in labor income to the analysis area on an average annual basis (Table 6-3).

While these impacts are comparatively less than other Ashley NF resources contributions it should be considered that these leases are an important compliment to livestock producers' grazing, forage, and hay production.

A thin profit margin often separates livestock producers from negative net earnings. Often, employment outside the ranch augments livestock producer income. Federal grazing land is particularly valuable because of the low grazing fees charged for use of this land. Fees charged by USFS for grazing are calculated using the formula required under federal grazing regulations found at 43 CFR 4130.81(a)(1) and are considerable less than those charged for private grazing land. In 2006 the statewide average AUM price for private land was \$11.7 in Utah and \$15.1 in Wyoming (USDA 2007). The federal formula yielded a fee of \$1.35 per AUM in 2007 which is down from \$1.56 in 2006. This federal land is the least expensive grazing land available, hence use and access is highly coveted by area cattle producers even though additional costs are usually incurred to use these lands.

6.7.3. Forest Products

While Uinta County is Wyoming's second smallest county by land area, it contains a high concentration of wood product processing facilities and is second amongst all Wyoming counties for number of wood product processing facilities. There were nine total primary wood product processing facilities in Uinta County in 2000, which included 3 sawmills, 2 post and pole facilities, 1 house log facility, and a log furniture manufacturer (USDA Forest Service 2005). In 2002 Duchesne and Uintah counties had 3 sawmills, 1 post and pole facility, and 6 house log facilities (USDA Forest Service 2006c). Patterns of timber market integration suggest the timber harvested in the area stays in the area. Nearly all of the timber harvested by the Ashley stays in the area (personal communication with Kelly Wilkins, Resource Specialists and Contracting Officer, Vernal Ranger District).

Annual harvests from the Ashley NF have decreased from a high of 26,669 thousand board feet (mbf) in 1988 to just 3,789 mbf in 2006 (Figure 6 below). Utah's industrial timber harvest was 41.3 million board feet (mmbf) in 2002 of which 12.5 percent was from Ashley NF timber. This is down from the share in 1992 when Ashley NF harvests accounted for 29 percent of Utah's total industrial timber harvest.

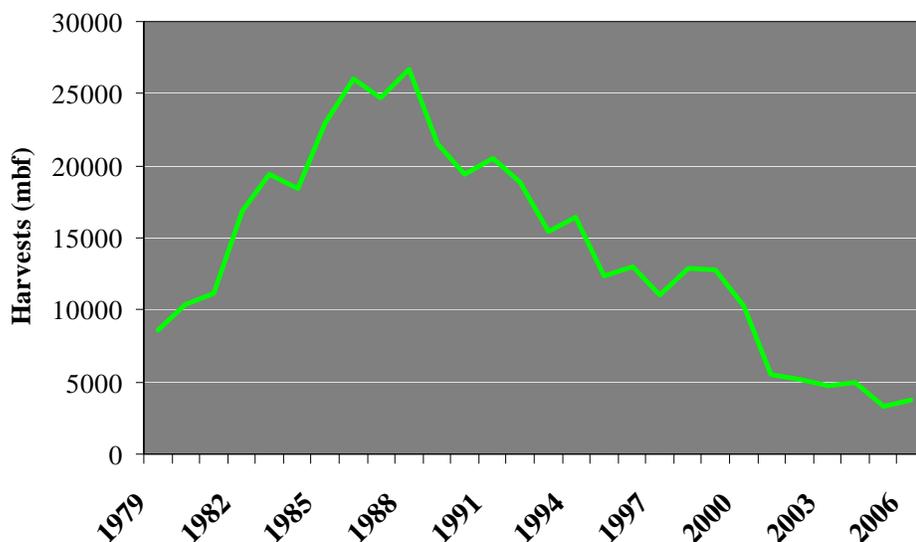


Figure 6-6. Ashley NF historic timber harvests (USDA Forest Service 2009c)

Harvest levels on the Ashley NF have supported approximately 39 jobs and \$982,000 in labor income to the analysis area on an average annual basis (Tables 6-3 and 6-4). In addition to saw timber, these contributions include estimated impacts from poles, posts and fuelwood provided by the Ashley NF.

6.7.4. Minerals

Saleable mineral use on the Ashley NF is limited to small amounts of crushed stone, dimensional stone, sand and gravel removed for commercial and community use. These uses have provided less than one job and \$20,000 in labor income to the analysis area on an average annual basis (Tables 6-3 and 6-4).

Leasable mineral development, which includes oil and gas, is more common in the area and occurs on the Ashley NF. Utah has consistently ranked in the top 15 oil-producing states and has experienced a rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico. The Uinta Basin is the largest oil and gas producing area in the state of Utah and almost all of the exploration and production activity occurs in Duchesne and Uintah counties (University of Utah 2007).

Production of both crude oil and natural gas continue to increase in Duchesne and Uintah counties. From a low of 7.3 million barrels in 2002, crude oil production in the two counties increased to 11.4 million barrels in 2006. Between 1997 and 2006 natural gas production in the two counties has increased from 81.2 to 226 billion cubic feet (bcf). Production is rising faster in the area than in the state of Utah as a whole. While crude oil production increased by 55 percent in Duchesne and Uintah counties between 2002 to 2006, production in the state increased by 30 percent. Between 1997 and 2006 natural gas production in the area increased by 178 percent while the state as a whole increased by 31 percent (Utah DNR 2007).

Between 1999 and 2008 the average sale price of a home increased by 61 percent from \$115,106 to \$187,762 in the Uintah Basin area (values adjusted for inflation to 2008 dollars) (UAR 2009). While some population growth has occurred in the area, the price increase may have occurred due to increased oil and gas development in the area (personal communication with Diane Coltharp, Uintah County Commission). Applications for Permits to Drill (APD) appear to have leveled off in both Uintah and Duchesne counties following a four year steady increase in applications; in 2007 APDs were down to 371 from a peak of 447 in 2006 in Duchesne County and in Uintah County decreased to 978 from 1,363 in 2006. This is also true for commenced drilling (spuds) in Duchesne County however in Uintah county spuds continue to increase (Utah DNR 2007). Approximately 1,200 APDs were issued on BLM land in 2006 while the Ashley NF issued approximately 10 APDs (personal communication with Peter Kempenich). While the area relies on oil and gas exploration and production, the Ashley NF likely contributes only a small proportion related economic activity.

6.7.5. Externally Funded Activities on the Ashley National Forest

A portion of the management activities occurring on the Ashley are performed with funds not accounted for under the general expenditures of the Ashley NF discussed below. These funds often come from external sources such as stewardship grants or private foundations and would not be spent in the area if the Forest Service did not allow this work. For example, fuels reduction for habitat improvements are funded by the Rocky Mountain Elk Foundation and the National Forest Foundation. In addition, counties in the area perform maintenance on Forest Service roads with gas tax dollars which provides an economic boost for the counties and is a major help to Ashley NF road maintenance. These externally funded projects on the Ashley support \$273,000 in labor income and 7 jobs to the area economy on an average annual basis.

In 2009, the Utah Partners for Conservation and Development will fund thinning, by hand crews, to create shaded fuel breaks in 2009. This work could support an additional \$58,000 in labor income and 3 jobs in the analysis area.

6.7.6. Revenue Sharing

In 1976, Congress passed legislation to provide funding to counties through Payments in Lieu of Taxes (PILT) in order to compensate for tax revenues not received from Federal lands. These taxes would typically fund various services that are provided by counties (road maintenance, emergency services, and law enforcement). The PILT payments are determined using a formula which accounts for the county acreage of federal land, county population and the previous year's revenue sharing from resource uses on federal land (timber, range, mining etc.). These PILT payments add to revenues that these counties routinely receive through local property taxes. Figure 7 displays previous year's payments. Given the high proportion of federal entitlement acreages to the populations in these counties, payments to counties are limited by their population size. In November of 2008 additional payments were authorized by the Emergency Economic Stabilization Act of 2008 (Public Law 110-343). The law authorizes local jurisdictions to receive their full entitlement level payment from 2008 through 2012.

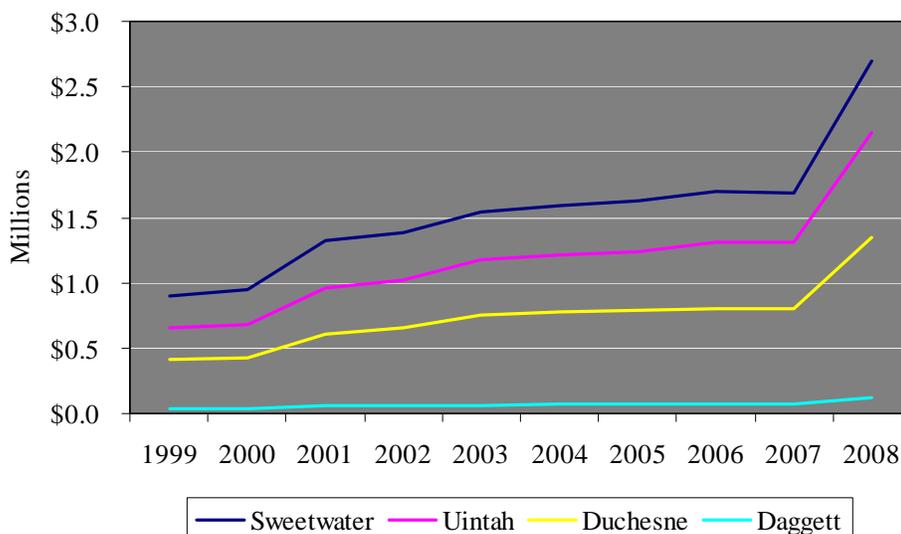


Figure 6-7. Payments in Lieu of Taxes for analysis area counties containing portions of the Ashley NF (Source: USDI PILT database)

In addition to PILT payments, counties receive a portion of the revenues generated on National Forest System lands. Historically, counties have received 25 Percent Fund payments. These payments returned 25 percent of all revenues generated from Forest activities, with the exception of certain mineral programs, and were paid based on the number of National Forest System lands within each county. These funds are used for the upkeep and maintenance of public schools and roads. These payments are affected by changes in resource output levels as a result of direction provided in the Forest Plan.

In 2000, Congress enacted the Secure Rural Schools and Community Self-Determination (SRSCS) Act, designed to stabilize annual payments to states and counties for the next six years beginning in 2001. The formula for computing annual payments is based on averaging a state's three highest payments between 1986 through 1999 to arrive at a "full payment amount." Counties could choose to continue to receive payments under the 25 Percent Fund or to receive the county's proportionate share of the state's full payment amount under SRSCS. Counties that elect to receive their share of the State's full payment amount were required to spend no less than 80 percent and no more than 85 percent of the funds in the same manner as the 25 Percent Fund payments. The balance of the payment must be reserved for special projects on federal lands or for county projects, or the reserved fund must be returned to the General Treasury. If a county's share of the full payment amount is less than \$100,000, all of the funds may be spent in the same manner as the 25 Percent Fund payments. The Act expired in September of 2007 however, was reauthorized as part of Public Law 110-343 in October of 2008 for an additional four years.

The PILT and SRSCS payments to each county that were associated with Ashley NF Lands are listed below in Table 6-5. PILT payments associated with the Forest are estimated based on the share of Ashley NF entitlement acreage from the total entitlement acreage in that county.

Table 6-5. Estimated Ashley NF PILT and SRSCS payments by county

		2003	2004	2005	2006	2007
Daggett						
	PILT	\$45,591	\$47,551	\$49,612	\$50,737	\$50,292
	SRSCS	\$59,564	\$61,656	\$63,074	\$63,705	\$63,574
	Total	\$105,155	\$109,207	\$112,686	\$114,442	\$113,866
Duchesne						
	PILT	\$613,361	\$632,468	\$644,177	\$656,906	\$654,572
	SRSCS	\$165,959	\$171,495	\$175,439	\$177,194	\$176,830
	Total	\$779,320	\$803,963	\$819,616	\$834,100	\$831,403
Sweetwater						
	PILT	\$31,326	\$32,173	\$32,852	\$34,370	\$34,227
	SRSCS	\$21,070	\$21,773	\$22,274	\$22,497	\$22,451
	Total	\$52,396	\$53,946	\$55,126	\$56,867	\$56,678
Uintah						
	PILT	\$173,777	\$178,712	\$182,442	\$193,213	\$192,433
	SRSCS	\$61,590	\$63,645	\$65,109	\$65,760	\$65,625
	Total	\$235,367	\$242,357	\$247,551	\$258,973	\$258,058

Source: USDI 2007, USDA Forest Service 2002 - 2006

Payments to states and counties associated with the Ashley NF provide approximately 24 jobs and \$1.1 million in labor income to the analysis area on an average annual basis (Table 6-3).

6.7.7. Non-market economic value

The value of resource goods traded in a market can be obtained from information on the quantity sold and market price. Since markets do not exist for some resources, such as recreational opportunities and environmental services, measuring their value is important since without these value estimates, these resources may be implicitly undervalued and decisions regarding their use may not accurately reflect their true value to society. Because these recreational and environmental values are not traded in markets, they can be characterized as non-market values.

Non-market values can be broken down into two categories; use and non-use values. The use-value of a non-market good is the value to society from the direct use of the asset; on the Ashley NF this occurs as recreational fishing, hunting, boating and bird watching. The use of non-market goods often requires consumption of complimentary market goods; such as lodging, gas, and fishing equipment.

Non-use values of a non-market good reflect the value of an asset beyond any use. These can be described as existence, option and bequest values. Existence values are the amount society is willing to pay to guarantee that an asset simply exists. An existence value of the Ashley NF might be the value of knowing that pristine alpine wilderness exists in the High Uintah Wilderness. Other non-use values are thought to originate in society's willingness to pay to preserve the option for future use; these are referred to as option values and bequest values. Option values exist for something that has not yet been

discovered; such as the future value of a plant as medicine. On the Ashley NF bequest and option values might exist for timber or numerous plant species.

Non-market use and non-use values can be distinguished by the methods used to estimate them. Use values are often estimated using revealed preference methods or stated preference methods while non-use values can only be estimated using hypothetical methods. While use and non-use values exist for the Ashley NF, evaluation may not be feasible during the planning process however, this does not preclude their consideration in the planning process.

6.7.8. Water

An important resource with both market and non-market values of noteworthy consideration is water. Water from the Ashley NF plays an important role in area communities. Adams-Russell Consulting collected information on values and beliefs about the Ashley NF during discussion with approximately 60 persons; this effort demonstrated unanimous agreement among participants that water is the most significant resource associated with the Ashley NF (Russell 2008). Downstream market uses of water are important to the local economy in addition to recreational and other non-market values. Market uses of water, dependent on water from the Ashley NF, include power generation, agricultural use and water for recreation and human consumption.

From the 1940's to the 1960's, hydroelectric projects were licensed and built on the National Forests which included the Flaming Gorge Dam built from 1958 to 1964. This facility provides power, water storage and recreation to the area. While the dam operates on land managed by the Ashley NF, the dam relicensing process will influence how the dam will operate for the next 30 to 50 years and will involve multiple agencies including the Forest Service. Participation in the relicensing process could strengthen mitigation and restoration programs on National Forest lands that would lead to improved aquatic habitats restored instream flow regimes, and increased water quality. Recent relicensing experiences have demonstrated that the benefit-to-cost ratio can be greater than 30:1; no other Forest Service program has a higher potential payoff (USDA Forest Service 2000b).

There exists an inherent complexity to the interplay of values associated with water from National Forest land. For example if water rights of downstream uses are not fully claimed, changes in allocation could affect flow, water quantity and uses such as recreation. Forest Plan revisions should incorporate instream flow needs to maintain public values. When a State undertakes a basin-wide adjudication of water rights, all beneficial consumptive and instream water uses on National Forest lands should be claimed in accordance with State and Federal laws (USDA Forest Service 2000b).

Resource management actions on the Ashley, such as timber management, may have an impact on conditions that affect watersheds and the capacity of the landscape to store water for market and non-market uses. Current trends in area energy development, and population growth discussed above could result in additional demands from water that originates on the Ashley NF. These trends reflect those occurring throughout the larger

West as diversion, consumptive use of water and demand for water based recreation has increased. Regardless, watersheds can be effectively managed for high-quality water while providing for other resource outputs (USDA Forest Service 2000b).

6.8. Ashley NF Contributions by Industry

Table 6-6 shows the estimated employment and labor income generated by activities on the Ashley NF relative to the analysis area economy. The Ashley NF related employment and labor income contributions listed here exclude those made from local resident recreation. In total, management activities of the Ashley NF account for 0.5 percent of jobs and 0.4 percent labor income in the analysis area (Table 6).

The industry sectors with the highest level of dependence on Ashley NF contributions are the Government and Agriculture sectors which account for approximately 1.3 and 1.2 percent of sector employment and 1.4 and 1.5 percent labor income, respectively. The Accommodation and Food Service sector is the third most dependent sector relying on the Ashley for 1.1 percent of its employment and labor income.

While data was not available to examine contributions from the Ashley NF uses by county or community, the labor income and employment generated from activities on the Ashley may be more important to these smaller communities within the analysis area. Consequently, changes in activities on the Forest could result in localized effects in areas that are more dependent on forest management. For example, the industry sectors with the highest levels of dependence on the Ashley NF were noted above to be the Accommodation and Food Service and the Arts, Entertainment and Recreation sectors. In Sweetwater and Daggett counties the Accommodation and Food Services sector accounted for 7.8 and 12.7 percent of total area employment in 2006. The Arts, Entertainment and Recreation sector accounted for 8.6 percent of total employment in Daggett County as well. These higher levels of dependence on these sectors, relative to other counties in the analysis area, indicate changes in management or activity on the Ashley could result in greater impacts to these counties.

Table 6-6. Current Ashley NF contributions to the analysis area

Industry	Employment .full and part time jobs)			Labor Income (thousands of 2008 dollars)		
	Area Totals	ANF Related	% of Total	Area Totals	ANF Related	% of Total
Agriculture	3,007	37	1.2%	\$29,142	\$449	1.5%
Mining	11,928	4	0.03%	\$1,173,257	\$480	0.04%
Utilities	928	2	0.2%	\$91,553	\$187	0.2%
Construction	10,287	11	0.1%	\$525,144	\$565	0.1%
Manufacturing	3,069	19	0.6%	\$205,596	\$489	0.2%
Wholesale Trade	2,102	14	0.7%	\$129,226	\$845	0.7%
Transportation & Warehousing	4,399	11	0.2%	\$288,096	\$610	0.2%
Retail Trade	12,147	76	0.6%	\$305,142	\$1,614	0.5%
Information	1,263	4	0.3%	\$55,114	\$131	0.2%
Finance & Insurance	2,929	8	0.3%	\$90,204	\$248	0.3%

Real Estate& Rental & Leasing	6,060	10	0.2%	\$186,356	\$268	0.1%
Prof. Scientific, & Tech. Services	4,250	9	0.2%	\$208,820	\$375	0.2%
Mgmt. of Companies	488	1	0.2%	\$18,360	\$31	0.2%
Admin., Waste Mgmt. & Rem.	3,370	9	0.3%	\$87,555	\$235	0.3%
Educational Services	857	2	0.2%	\$16,387	\$39	0.2%
Health Care & Social Assistance	5,621	16	0.3%	\$195,400	\$554	0.3%
Arts, Entertainment, and Rec.	5,766	18	0.3%	\$123,800	\$427	0.3%
Accommodation & Food Services	10,413	119	1.1%	\$208,522	\$2,193	1.1%
Other Services	5,854	23	0.4%	\$172,254	\$469	0.3%
Government	15,027	191	1.3%	\$719,177	\$10,095	1.4%
Total	109,767	584	0.5%	\$4,829,104	\$20,305	0.4%

Within the analysis area the two largest sectors are Government and Mining (see figures 2 and 6) which includes oil and gas related activities. Since data was unavailable on current levels of oil and gas exploration and production on the Ashley NF, it is difficult to say how much of the Mining sector can be attributed to activity on the Forest. However 1.3 percent of employment and 1.4 percent of labor income within the Government sector is dependent on Ashley NF related activities (Table 6-6). As noted above, smaller communities within the analysis area may be more dependent on these sectors and thus more susceptible to changes on the Ashley NF. All analysis area counties are relatively dependent in terms of employment and labor income on the Government and Mining sectors. Daggett County depends on the Government Sector for 44 percent of its employment and 68 percent of its labor income.

Tourism and recreation related industries provide approximately 29 and 13.5 percent of employment and labor income, respectively within the analysis area (Figures 2 and 5). Tourism and recreation related contributions are associated with Retail Trade, Accommodation and Food Services, and the Arts, Entertainment, and Recreation sectors. The percent of jobs generated in these sectors as a result of Ashley NF contributions are estimated at 0.6, 1.1, and 0.3 percent. The percent of labor income generated in these sectors as a result of Forest activity are estimated at 0.5, 1.1, and 0.3 percent (Table 6-6).

Natural resource related industries provide approximately 18 and 33 percent of employment and labor income, respectively within the analysis area (Figures 2 and 5). The sectors most closely connected to activities associated with the timber management and grazing program areas are manufacturing and agriculture. The Forest contributes an estimated 1.2 and 1.5 percent of jobs and labor income in the agriculture sector and 0.6 and 0.2 percent of employment and labor income in the manufacturing sector.

6.9. Potential Risks to Economic Sustainability

As discussed in the sections *Ashley National Forest Contributions to the Area Economy* and *Ashley National Forest Contributions by Industry*, the Ashley makes a small but important contribution to many different sectors of the economy in northeastern Utah and southern Wyoming. For example, resources such as forage for livestock, wood for forest products, minerals, and water directly contribute to the livelihood of some area residents. Jobs and retail sales associated with tourism are also important, especially in counties

with a high percentage of public land and few other industries represented. Reduction of these uses, or fluctuating and unpredictable availability of resources such as wood products, poses a risk to economic sustainability of related businesses.

6.10. 1986 Forest Plan Desired Future Conditions

6.10.1. Recreation, Grazing, and Forest Products

Desired future conditions and goals for recreation, grazing, and forest products were generally described from an ecological or social perspective in the 1986 Forest Plan and did not consider the economic contributions of these resources. However, there are some exceptions. For example, the desired future condition for grazing did state that the range program would be, “managed to optimize the production and use of forage on all suitable range to the extent it is cost effective and in harmony with other resource uses.” Also the goal for timber was to, “Optimize wood fiber production to meet public demands consistent with other resource objectives and environmental constraints.”

Major Changes Since 1986

Recreation

Recreation on the Ashley NF has increased sharply since 1986. Also the types of recreation activities have changed. For example, ATV use is now a major component of recreation on the Forest. Dispersed camping has also changed as more and larger camp trailers are placed on the Forest. These examples have likely changed the economy as people purchase these types of recreational vehicles within the surrounding communities.

Grazing

There have been changes in permitted livestock grazing since the 1986 Forest Plan. Summary records for 1987 document that 29,006 sheep and 12,303 cattle and horses were permitted. In 2004, 9,700 sheep and 13,666 cattle and horses were permitted. This shows a reduction of 17,795 sheep or 66% during this 17-year period. Permitted numbers of cattle has increased by 1,363. These numbers document the trend of a reduction of sheep on the Forest and a conversion of sheep allotments to cattle allotments. However, although sheep numbers have decreased on the Forest, total Animal Unit Months (AUMs) have remained about the same. There has also been a reduction in the number of permit holders from 130 in 1986 to 107 in 2004. This represents a reduction of about 18% in this 17-year period.

Forest Products

The beginning of the first planning period (1986) was dominated by the on-going bark beetle epidemic in lodgepole and ponderosa pine. The emphasis then was on salvaging the dead trees and trying to convert older stands to younger ones in order to make these two forest types less susceptible to beetles. There was a strong demand for forest products from local industry at this time. For example, the annual sale quantity (ASQ) was at 21,000 Mbf at the beginning of the plan period and is much less currently. Currently, the average annual volume removed has been 5,407 Mbf, which includes personal-use firewood (1,827 Mbf/year). Of this 5,407 Mbf removed, 1,024 Mbf was live or 18% of the total. Of the 1,024 Mbf of live volume removed per year 555 Mbf was

posts and poles or 54%. These figures show the decline in forest products since the 1986 Forest Plan.

6.10.2. Minerals and Energy

The 1986 Forest Plan did not identify Desired Future Conditions for the topic of Minerals and Energy. The Forest Plan did identify goals, objectives, and standards and guidelines for this subject area.

The goal for Minerals and Energy in the 1986 Plan is:

- Provide orderly exploration, development, and production of mineral and energy resources consistent with the use and protection of the other resource values.

6.10.2.1. Major Changes Since 1986

Since 1986 there have been a few mining claims that have become active and are currently operating. Desert Generation and Transmission (DG&T) operates a limestone open pit mine in the Vernal Ranger District. The limestone is used for emission control at their Bonanza power plant and another power plant in Price, Utah. Operations for this claim were approved in 1999 and about 150,000 tons of limestone has been quarried from this site.

Shamrock Mining Associates has expanded their mining operation located in the Slate Creek drainage. This operation began in 1997 and removed about 200 tons of material to satisfy a small market and to develop a larger market. Their expanded operation will allow them to remove up to 6,000 tons of calcite per year.

Over a period of several decades, forty oil and/or gas wells have been drilled within on the Ashley NF, which have been abandoned. However, due to the recent rises in price for crude oil and natural gas, the Ashley NF has seen an increase in activity by the industry to develop oil and gas resources particularly in the South Unit.

6.11. Need for Change Summary

Since 1986 production of forest products has decreased and, although there has been changes in the type livestock grazing on the Forest, animal unit months have stayed about the same. The revised Forest Plan should address these changes.

The 1986 Forest Plan provides only superficial discussion of mineral resources and somewhat limited standards and guidelines for the management of locatable and leasable mineral resources. Present direction is focused on controlling mineral exploration and development activities to protect other resources, and restore disturbances from mining or leasing activities.

In general, the 1986 Forest Plan does not discuss the actual management of mineral resources; it only discusses how mineral activities should not impact other resources. Additional information concerning the inventory and management of each of the mineral resource categories (i.e., locatable, leasable, and saleable) is needed. Such action is necessary in order to develop management protocols designed to create meaningful

standards and guidelines that conform to the national energy policies that have been developed by the Forest Service since the 1986 Forest Plan. Also, the revised Forest Plan needs to address paleontological resources such as fossils and develop standards and guidelines for the protection of karst systems.

Currently there is no need for change in Forest Plan direction regarding economic sustainability. Changes may be necessary to respond to ecological desired conditions.

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8. Appendices

8.1. **Appendix A: Guidelines for identifying revision topics**

The Ashley NF developed the following considerations to help us evaluate topics suggested for inclusion in revision:

Forest Plan vs. Non-Plan

- Is it the kind of direction that belongs in a Plan, or does it fit better somewhere else?
 - Is it strategic or specific/technical information?
 - Is it within our authority or area of influence?
- Do we need Plan direction to address it, or do we already have adequate direction/authority to handle it?
 - Does it simply repeat existing direction contained in directives, laws, regulations or agreements already in place?
 - Can we take necessary action now, without waiting for revision?

Effect on Resources (Making a Difference on the Ground):

- Is this causing (or is it likely to cause within the next 5 years) a significant decline in resource conditions?
 - How likely is it that resource problems will occur? Will there be a lot of pressure on this “weak spot” in the next 5 years?
 - If they do occur, how bad will they be? How hard will they be to fix once they occur?
 - Are the anticipated effects wide-spread or site-specific?
- Is this making it harder for us to accomplish work or achieve desired conditions?
 - Would addressing this issue now make resources and/or programs more resilient in the face of changing management pressures?
 - Would it help us be more effective in achieving or maintaining desired conditions?
 - Would it help us develop better management strategies in a geographic area that has been determined to be a priority for revision?

Customer Service:

- Is it something people want and need us to address?
 - Is responsive to external individuals? Organizations? Communities?
 - How many resource areas are affected? Is it a multidisciplinary problem?
- Does it make sense?
 - Is it useful and do-able? Does it really help us understand what we should be doing, how well things are working, or whether we’re improving conditions on the ground?

Consistency

- Would addressing this issue provide consistency with national direction, directives, or the strategic plan?
- Would it help bring us in line with current science and management theories?
- Would it help us comply with laws/regulations or mandated timeframes for action?

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8.2. Appendix B: Process used to develop geographic areas and map

Forest Plan Revision will be structured around broad geographic areas. These areas will serve to focus public involvement efforts during revision. They will also serve as tools for developing clear, site-specific desired condition descriptions to guide management. Defining desired conditions at this level recognizes differences in resource capability and visitor use patterns across the Forest, and should be more useful than a single Forest-wide vision statement. Finally, geographic areas can serve as tools for defining the scope of revision. The level of investment we make in reviewing/revising management direction is likely to vary by area, based on the issues associated with each one.

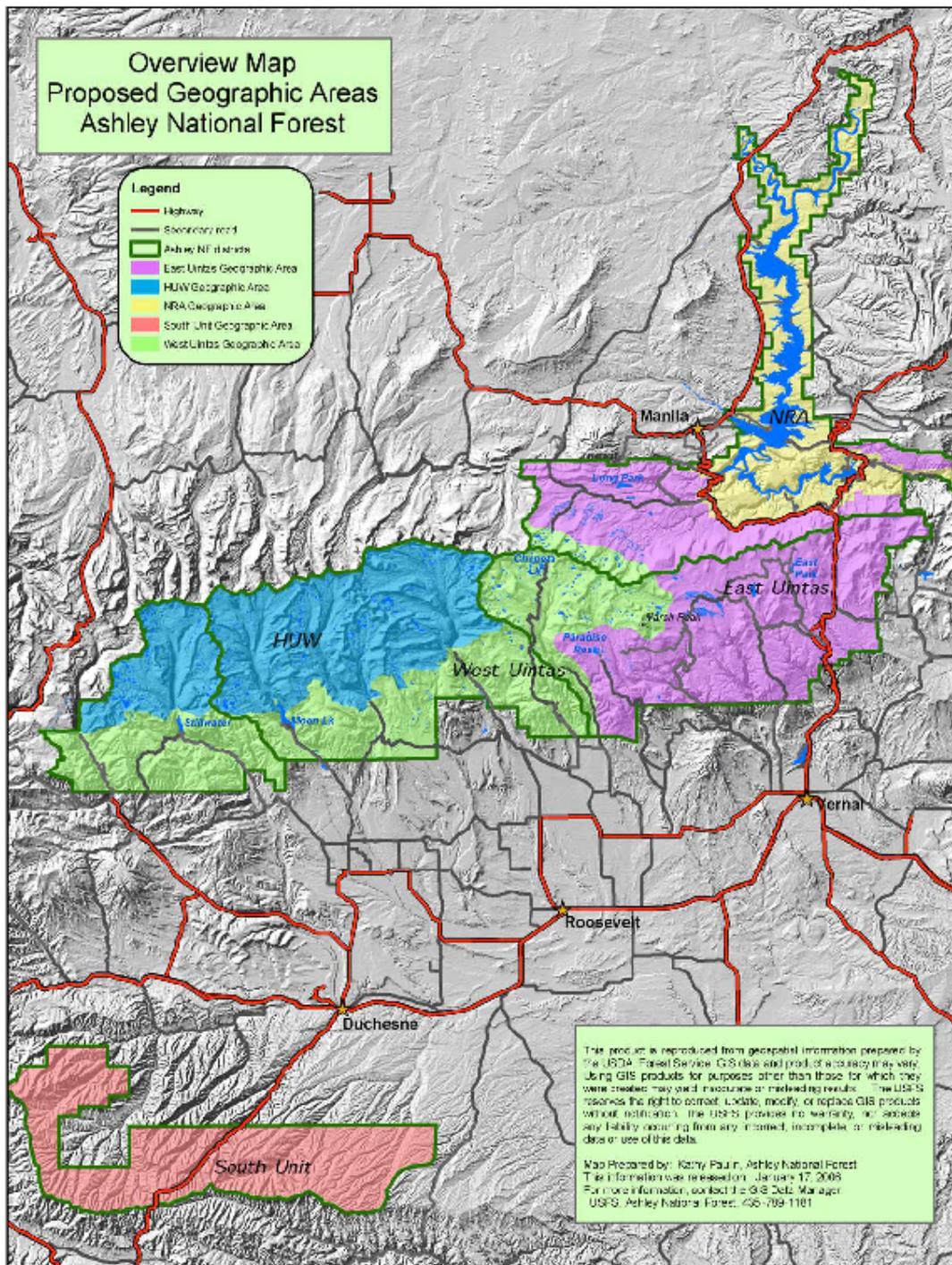
The team considered three basic objectives when selecting geographic areas:

- Choose areas with a strong sense of place for Forest users
- Choose areas that group together similar resource values/conditions
- Choose areas based on source and adequacy of existing management direction

Some existing ecological or management unit boundaries that were considered include:

- Relatively large Congressionally designated areas (High Uintas Wilderness, Flaming Gorge National Recreation Area)
- Ecological land units (sections, subsections, landtype associations)
- South Unit of the Duchesne Ranger District
- Developed/undeveloped areas as shown in the roadless area inventory
- East vs. west Uintas (using subsection lines to divide)
- High country vs. canyons (divide along elevation line?)
- Fire management units (FMUs)

The team ultimately recommended five geographic areas that combined elements of several existing unit boundary maps (see map below). Because the HUW and NRA have detailed management direction associated with their designation, this proposal does a good job of grouping areas that may need different levels of investment during revision. The east-west Uintas line follows subsection boundaries, which is rather obscure to the average Forest user, but because this also represents some distinct changes in the character and capability of landscapes, it is fairly consistent with the objective of mapping different resource conditions. This map also matches up well with patterns of recreation use observed on the Forest, suggesting that the areas have a distinct sense of place for the public.



8.3. Appendix C: Sustainable conditions for vegetation models

Vegetation Model Description	Acres	Structure Class	Sustainable Conditions (%) ¹⁶	Sources ¹⁷
Black sagebrush-Pinyon/Juniper	12,330	Sagebrush – Early	10	R4 PFC, Local observations and studies
		Sagebrush – Mid	15	
		Sagebrush – Late	65	
		PJ – Shrub	5	
		PJ - Shrub-open tree, Tree-shrub, & Closed canopy	5	
Wyoming big sagebrush-Pinyon/Juniper	54,056	Sagebrush – Early	10	Davies et al. 2006, Goodrich et al. 1999, Goodrich 2008
		Sagebrush – Mid	25	
		Sagebrush – Late	30	
		PJ – Shrub	5	
		PJ – Shrub-open tree	5	
		PJ – Tree-shrub	5	
		PJ – Closed Canopy	15	
		Chained/Seeded Areas	5	
Mountain big sagebrush-Pinyon/Juniper	19,802	Sagebrush - Early	10	Local observations and studies
		Sagebrush - Mid	20	
		Sagebrush - Late	15	
		PJ – Shrub	20	
		PJ – Shrub-open tree	20	
		PJ – Tree-shrub	5	
		PJ – Closed Canopy	10	
Mountain shrub-Pinyon/Juniper	72,167	Mountain shrub - Early	10	R4 PFC, Local observations and studies
		Mountain shrub - Mid	35	
		Mountain shrub - Late	45	
		PJ – Shrub-open tree, Tree-shrub, & Closed canopy	10	
Mountain big sagebrush-Aspen	125,332	Sagebrush – Early	25	R4 PFC, Connelly et al. 2000
		Sagebrush – Mid	45	
		Sagebrush – Late	26	
		Aspen w/ sagebrush understory	1	
		Aspen – Grass/forb & Seedling sapling	10	
		Aspen – Young forest	20	
		Aspen – Mid-aged & mature forest	70	
		Aspen – Mature & Old forest	3	
Ponderosa pine-Aspen	44,912	Ponderosa – Grass/forb & Seedling sapling	10	R4 PFC (adjusted to fit the Ashley NF), Reynolds et al. 1992
		Ponderosa – Young & Mid-aged forest	50	
		Ponderosa – Mature forest	20	
		Ponderosa – Old forest	20	
		Aspen – Grass/forb	20	
		Aspen – Seedling/sapling & Young Forest	35	
		Aspen – Mid-aged & and Mature forest	30	
		Aspen – Old forest	15	

¹⁶ Total for models with an aspen component is 200% in order to track structural diversity and assign sustainable conditions for aspen communities.

¹⁷ Full citations found in the *References* section of this report

Vegetation Model Description	Acres	Structure Class	Sustainable Conditions (%)		Sources
Douglas-fir-Aspen	94,310	Douglas-fir – Grass/forb & Seedling sapling	15		R4 PFC, Reynolds et al. 1992
		Douglas-fir – Young forest	20		
		Douglas-fir – Mid-aged & Mature forest	45		
		Douglas-fir – Old forest	20		
		Aspen – Grass/forb	20		
		Aspen – Seedling/sapling & Young Forest	35		
		Aspen – Mid-aged & and Mature forest	40		
		Aspen – Old forest	5		
			West¹⁸ Uintas	East¹⁹ Uintas	
Mixed conifer-Aspen	284,277	Mixed conifer – Grass/forb & Seedling sapling	16	27	Trout Slope Landscape Assessment ²⁰ , Reynolds et al. 1992
		Mixed conifer – Young & Mid-aged forest	32	53	
		Mixed conifer – Mature forest	24	13	
		Mixed conifer – Old forest	28	7	
		Aspen – Grass/forb	20	20	
		Aspen – Seedling/sapling & Young Forest	35	35	
		Aspen – Mid-aged & and Mature forest	30	30	
		Aspen – Old forest	15	15	
Lodgepole pine	76,110	Lodgepole – Grass/forb & Seedling/sapling	20	42	Trout Slope Landscape Assessment, Reynolds et al. 1992
		Lodgepole – Young & Mid-aged forest	40	50	
		Lodgepole – Mature & Old forest	40	8	

¹⁸ West Uintas Geographic Area¹⁹ East Uintas Geographic Area²⁰ Trout Slope Landscape Assessment (USDA Forest Service 1996)

8.4. Appendix D: Vegetation structure definitions

Mountain big sagebrush, silver sagebrush, and basin big sagebrush

Percent canopy cover	Seral Stage
0 – 10	Early
11 – 20	Mid
21 +	Late

Wyoming big sagebrush and black sagebrush

Percent canopy cover	Seral Stage
0 – 5	Early
6 – 15	Mid
16+	Late

Mountain shrub species²¹

Percent canopy cover	Seral Stage
0 – 10	Early
11 – 20	Mid
21+	Late

Pinyon & Juniper VSS²² (as described in Huber and Goodrich 2008)

VSS Code	Description
0 – 1	Skeleton forest
2	Annual
3	Perennial forb/grass
4	Shrub (1-5%)
5	Shrub-open tree (6-15%)
6	Tree-shrub (15-35%)
7	Closed canopy – Mature old (36+)

Conifer VSS including Aspen (as described in the Trout Slope Landscape Assessment – Appendix 4)

VSS Code	Description	Lodgepole & Aspen	Mixed conifer & Douglas-fir	Ponderosa pine ²³
1	Grass/forb	0" – 1" dbh	0" – 1" dbh	0" – 1" dbh
2	Seedling/sapling	1" – 3" dbh	1" – 4" dbh	1" – 5" dbh
3	Young forest	3" – 6" dbh	4" – 8" dbh	5" – 12" dbh
4	Mid-aged forest	6" – 9" dbh	8" – 12" dbh	12" – 18" dbh
5	Mature forest	9" – 12" dbh	12" – 16" dbh	18" – 24" dbh
6	Old forest	12" + dbh	16" + dbh	24" + dbh

²¹ Mountain mahogany (*Cercocarpus*) species

²² Vegetative Structural Stage

²³ From Utah Northern Goshawk Project (USDA Forest Service 2000a)